NATURE MAGAZINE

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NATURE MAGAZINE

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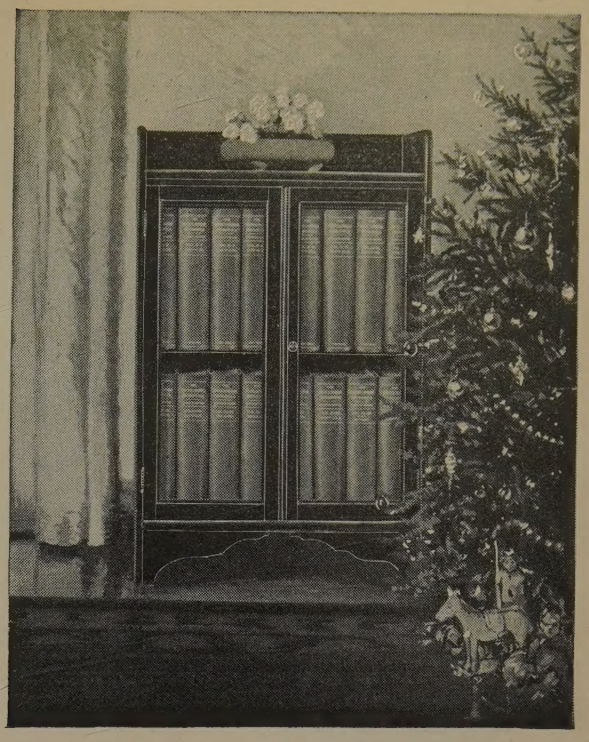

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makes three notable contributions to future historians

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He was more cruel than Geronimo, the Apache; more capable in directing his men than Attila, the Hun; more resourceful in campaigning over broken country than Ghengis Khan. He was unquestionably the greatest outlaw this continent ever knew. It is possible that he was the greatest bandit in the recorded history of the world.

For eight years (1911–19) his word was law in one hundred thousand square miles of Mexican territory. At the height of his power he rode at the head of twenty thousand men. He laid a score of cities waste, executed more than twelve hundred prisoners, collected several million dollars in loot, married twenty-six women, named two presidents of Mexico, offered to declare war on the United States, and at last died, penniless, from a sabre thrust in a duel. His body was buried by one of his Indian girl wives.

Here is his history—pages written with a *machete* and punctuated with a rifle—told by one who knew him in the beginning, who campaigned with him when he was successful and who said "good-bye" to him just before the final, spectacular duel that ended Zapata's life.

HOW FRANCIS JOSEPH MADE GOLD

Francis Joseph I, Emperor of Austria, Apostolic King of Hungary, was known to the world as a hard-boiled, shrewd, prosaic, unimaginative, heartless, pedantic bureaucrat. His brain was a card index and his soul a filing cabinet.

Yet a truly adventurous idea once took possession of the man. He longed for the ancient alchemist's secret and attempted to turn silver into gold.

Three confidence men sold him a gold brick. It is the most sensational story found in the opening of the Imperial Secret Archives in Vienna. No fiction writer ever dared to propose so fantastic and brilliant a swindle as this and no puppet dupe of a novelist's creation ever swallowed bait so completely as the Emperor of Austria.

The article is substantiated with photographs of the documents.

THE STEEL CORPORATION AND THE WORLD WAR

Ida M. Tarbell, in her Life of Judge Gary, for the first time reveals the secret history of the steel industry, during the greatest war the world has ever seen.

A Glass of Wine with the Borgias

THE youth hesitates, hand on glass. Will he obey the imperious look of command in the eyes of the beautiful Lucrezia—the magnet that has drawn him to this supper in the pontifical apartment? Will he yield to the ingratiating advances of Caesar Borgia and partake of the proffered cup? Or will he be warned before it is too late by the sinister glance shot from the cruel eyes of the old Pontiff as he coldly calculates the destruction of the young gallant.

To comply or refuse is equally hazardous. If he decline the poisoned draught, will he escape the knife of the hired assassin even now lurking in the shadows of the papal palace?

Rodrigo Borgia (Alexander VI), Lucrezia and Caesar formed the diabolical trinity which sat for eleven years upon the papal throne in Rome, an impious parody of the Holy Trinity—the most perfect incarnation of evil that ever existed on earth. How many gallant lives thus darkly and without commotion passed out of sight, whirled away by the headlong torrent of the ambition of that terrible triumvirate, is told as only that great weaver of word pictures, Alexandre Dumas, could tell in

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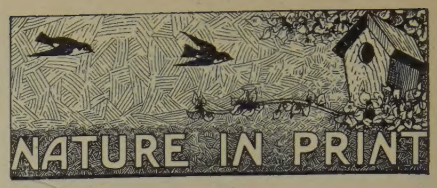

Animals of Land and Sea

In *Animals of Land and Sea,* published by D. Van Nostrand Company, 8 Warren Street, New York City, Dr. Austin Clark, Curator of the Smithsonian Institution, has done a distinct service to the lay naturalist. As the author says in his preface, he has attempted "to present the animal world as a living unit, showing the interrelationships of the various divisions, and the relations of the whole to the plant world, to physical conditions and to man. Such a treatment is complementary to the usual one in which the various animal types are taken up in sequence and separately discussed." The volume is readable. It is no tome, but an attractively written and illustrated Nature book. It is for the scientist as well as the layman, and we are glad we have it on the bookshelf near our desk.

Picturesque America

"At present the development of educational facilities is principally along the lines of Nature guide work and museum expansion," writes Stephen T. Mather, Director of the National Park Service, in a foreword on the appeal of our national parks in *Picturesque America.* "Under the former on field trips conducted by Nature guides the various natural history subjects observed along the trailside are explained, and campfire lectures are given on the flora and fauna, geology and other phases of Nature exemplified in the park areas. The establishment of museums is going forward slowly, but there is increasing momentum, and even in the parks where no museum exists at the present time, material to form the nucleus of museum exhibits is being collected." This volume is profusely illustrated, attractively printed and covers all of the playgrounds of our continent. It is edited by John Francis Kane and published by *Resorts and Playgrounds of America,* 51 East Forty-second Street, New York City.

Animal Ingenuity

Much misinformation is abroad about life in Nature. It is based on legend and on superstition. Many of these stories have the attraction of being highly entertaining. Most of them are false or gross exaggerations. In Nature, however, there are myriad things of marvelous ingenuity performed by bird, animal and insect. It is these ingenious habits and abilities that C. A. Ealand has collected and written together in a volume entitled *The Marvels of Animal Ingenuity.* It is brought out by the J. B. Lippincott Company of Philadelphia.

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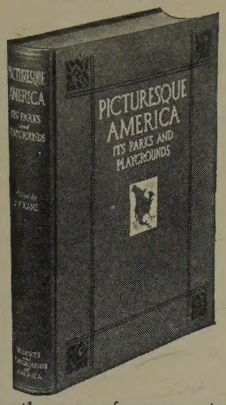

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It is the Nature background that makes *High Lights of Geography: Europe,* by David Starr Jordan and Katherine Dunlap Cather, particularly charming as a text-book. This volume, just published by World Book Company at Yonkers-on-Hudson, comes as a companion to a similar volume on North America. The working out of both these volumes is the same, telling the stories of Nature at work and interpreting existence in the terms of the natural laws that have made it what it is. This sort of treatment is particularly adapted to stimulating imagination and creating a firm foundation of geographic knowledge.

Nature's Mystic Clue

This is the title which Dwight Goddard, of Thetford, Vt., has given to his volume brought out personally. It is the story of David Lisle, a "Nature Mystic," the son of a Canadian woodchopper and a New England school teacher. It traces his experiences with life in arriving at his philosophy, the clue to which is the part of Nature in the scheme of things.

Projects for the Grades

"To the American Nature Association: A small contribution to Nature Study by a member of the Association." This is the penned personal dedication we find in the flyleaf of *Projects for All the Grades,* written by Frank M. Rich, Principal of School Two, Patterson, N. J. The little volume is published by A. Flanagan Company of Chicago. In his book, Mr. Rich covers grades one to eight, arguing exclusively from the point of view of the project method of seeking to cover all phases of the work in each grade. He does not confine himself to Nature study, but gives this its proper essential place in the education work.

For the Aquarist

A recent issue of *The Amateur Aquarist,* an attractive and instructive English publication, styles the following a "novel suggestion." We agree and quote: "For observing the development of aquatic plants grown under semi-natural conditions, a good plan is to obtain a number of large glass jars and, after filling them with water and planting the specimens in soil to their liking, sink the receptacles in pits in the garden so that light can only enter from the surface. The jars can always be removed for inspection without disturbing the plants, whilst experiments in the matters of light and soil are easily carried out."

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This insectary is engaged in research work to determine the possibilities of using the so-called lady bug, to rid vineyards of the mealy bug, a pest which is causing much loss. This mealy bug is a small insect which multiplies very rapidly and which thrives on the juices of the young and tender grapevine shoots. The female grows about four or five times larger than the male, which it outlives. The bugs are very destructive to the grapevines, as the fluid substance deposited by them on the tender shoots causes a discoloration of the grapes.

Lady bugs, however, live and thrive well on mealy bugs. Thus, in the process of raising them, it is first necessary to raise mealy bugs to feed and fatten them. For this purpose potatoes are planted in small trays filled with a few inches of soil. Each room contains sufficient trays of potatoes to plant the equivalent of an acre. The rooms are kept dark and held at a constant temperature of 65° F. until the potatoes have sprouted and developed long shoots. The purpose of a dark room is to cause the sprouts to grow long and spongy with a minimum of leaves.

After the sprouts have developed, a few mealy bugs are planted on them. The temperature from then on is maintained constantly at 80° F., causing the mealy bugs to multiply very rapidly, each hatch producing about 600 eggs which hatch into two bugs in about a month. After the mealy bugs have developed, beetle bugs are placed on the sprouts to feed on them.

At present three different species of lady bugs are being propagated; one is imported from Australia and the other two are produced in California. The lady bugs eat nothing but the mealy bugs. They lay and hatch about 250 eggs at one time, the first hatch taking place in about twelve days, the insect being in the form of an immature worm or larva. The larva then develops into the adult stage. Before the stage of pupation or transformation the beetle bugs crawl from the sprouts to sacks placed immediately behind the trays.

At this stage of the development light is admitted and the insects develop wings, then seeking the light and collecting on the windows. They are then gathered from the windows and placed on the infected grapevines.

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St. Nicholas believes in a well-balanced menu for the youthful mind. It mixes the sweets with more substantial food. It is a cherry magazine—an entertaining magazine—but at the same time it is an educational influence of incalculable value.

A thrilling adventure yarn will be followed by a travel tale, an article on natural history will be sandwiched in between a jolly ballad and an up-to-the-minute sports story, a biographical sketch will follow a mystery tale.

Nothing has ever been too good for St. Nicholas, or ever will be. The most famous of writers contribute the very best that is in them. "Little Lord Fauntleroy" and Mark Twain's "Tom Sawyer Abroad" first appeared in its pages. Other famous contributors have been Longfellow, Whittier, Bryant, Louisa M. Alcott, Brander Matthews, Eugene Field, Kate Douglas Wiggin, Rudyard Kipling, Theodore Roosevelt—and the standard of today is equally as high.

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Heywood Broun, of the World, in a discussion on books for boys and girls, recently said, "The bound volumes of ST. NICHOLAS we remember as a mine of delightful and exciting stories."

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The St. Nicholas Program for 1926

The St. Nicholas program for the coming year is one that will delight the heart of any child.

First of all there will be the serials. The St. Nicholas serial stories rank high. They are well told and ably illustrated. They represent the best in their field.

During 1926, St. Nicholas will run four serials—"Adventure Isle" by George Allan England, "Dorothea's Double" by Margaret Johnson, "The Northumbrian Figurehead" by Augusta H. Seaman, and "The Enchanted Flivver" by Berton Braley. The first is a thrilling adventure yarn, the second a fascinating and humorous tale about a delightful group of boys and girls, the third is an absorbing mystery story and the fourth is a rollicking tale that will bear comparison with "Alice in Wonderland" and the famous St. Nicholas classic, "Davy and The Goblin."

Scores of Interesting Short Stories and Features

Each number of St. Nicholas will have its usual golden store of short stories. There will be at least four tales in each issue, covering a wide range of adventure, sport, and romance.

Among the features for the new year will be a series of aviation stories by A. M. Jacobs, a series of nature stories by the well-known Dallas Lore Sharp, a number of travel articles by favorite St. Nicholas authors and several story biographies from the pen of Mrs. Katherine Dunlap Cather.

In addition to the serials, short stories, articles and sketches, St. Nicholas will have its usual quota of ballads, rhymes, and pictures.

The St. Nicholas Departments

The St. Nicholas departments form an important feature of the magazine. There are six of them—RADIO, NATURE AND SCIENCE, THE WATCH TOWER, ST. NICHOLAS LEAGUE, THE LETTER BOX, and THE RIDDLE BOX.

The contents of three of these are supplied by St. Nicholas readers themselves. Boys and girls who read the magazines write and draw and photograph for the LEAGUE, those with nimble wits fill THE RIDDLE BOX with "nuts" often too hard for older folks to crack; and our world-wide circle of friends keep THE LETTER BOX crammed with interesting bits of information about themselves, their homes and their hobbies.

THE RADIO DEPARTMENT, conducted by W. F. Crosby, clearly presents instructions for making sets, and keeps its readers abreast of the latest developments in the field.

NATURE AND SCIENCE for Young Folk is a section that presents odd facts, unusual scientific information and short natural-history stories.

THE WATCH TOWER, conducted by Edward N. Teall, keeps thoughtful boys and girls informed of world events. Mr. Teall interprets the mass of news, views and conflicting reports, and sets the youthful mind on the right track toward understanding present day affairs.

St. Nicholas invites itself into your home with the proud consciousness of past achievements, and with the promise that it will be a staunch and faithful friend, a guide, a helper and a constant influence for good.

S.N. 9-25

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December

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Nature Calendar

DECEMBER

Winter Days

"Now comes the graybeard of the north,
The forests bare their rugged breasts
To every wind that wanders forth,
And, in their arms, the lonely nests
That housed the birdlings months ago
Are edged with flakes of drifted snow."

—Henry Abbey.

The ground pine trailing through the leaves in the ravine is a bright touch of mid-winter greenery.

Some clear December evening, when there is no moon to dim the brightness of the heavens, go out and study the stars. Conspicuous now is a group of stars, the Hyades, shaped like a "V" with the brilliant red Aldebaran at the end of one of the forks. This cluster of stars is in the constellation Taurus.

The birds wintering with us are now more concerned with their food problem than with the temperature. Have you put up a lunch counter for them?

The gay-spirited little chickadee is not only a cheery sight for dull wintry days but his insectivorous habits are valuable to us in helping rid our trees of injurious insects.

Pigweed and lamb's-quarter seeds are now popular with winter birds. If there is snow on the ground you will see a maze of bird tracks beneath these weeds where birds have come to lunch on the little black seeds scattered there by the winds.

The curled dock, so abundant in fields and by the roadsides, is another favorite bird lunch counter these days.

How perfectly does the brown creeper match the brown-gray bark of the tree trunks up which he spirals in search of the larvae and eggs of insects.

It has been said that "a noisy titmouse is Jack Frost's trumpeter." You will agree when you hear his sharp whistle from a nearby tree.

On warm sunny days you may find small beetles in the woods where they have come from their hiding places in crevices or under the leaves on the ground.

Juncos and sparrows mingle at our kitchen doors, seeking the crumbs which may be scattered to them.

The cousin "bird drummers," the hairy woodpecker and the downy woodpecker, do not have similar tastes. The former likes the deep silent woods while the latter prefers the orchards and dooryards of man.

Golden-crowned kinglets are quite sociable. When you see one of them you may be sure that others are somewhere about.

The seed pods at the end of the tall stalks of the mullein are regular rattle-boxes when the wind blows.

The berries now hanging on the nanny-berry or high-bush cranberry will remain even until the new leaves of next spring have come.

The brown sprays of the golden-rod hold the snow on them in white tufts like bolls of cotton.

Beneath the dried and matted leaves in the woods the hepatica plant remains bronzy-green during the winter until the first warm days of spring coax it to bloom.

Many plants furnish winter quarters for insects. Examine the fruit panicle of a sumac and see how snugly some of them are living.

The Christmas dinner of the weasel will probably be a rabbit or mouse which he has caught unawares.

Perfect snow crystals have six sides. Snowflakes are formed of fused snow crystals. If you are interested in exquisite designs examine them under a microscope.

Goldfinches, in somber winter feathers, are in harmony with the dried weeds of the fields where they search for seeds.

Prepared by the Cleveland Museum of Natural History for Nature Magazine

PHOTOGRAPH COPYRIGHT H. ARMSTRONG ROBERTS

JUST A PAIR OF GOOD PALS

There are no words that can fully express the love of a boy for his dog nor the devotion and loyalty of the dog to his master, boy or man. It is an experience that one should not be denied if it is possible to have it.

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NATURE MAGAZINE

Vol. VI DECEMBER, 1925 No. 6

God makes sech nights, all white an' still,
Fur'z you can look or listen;
Moonshine an' snow on field an' hill,
All silence an' all glisten.

—JAMES RUSSELL LOWELL.

The German Shepherd—Dog of Ancient Lineage

By ALBERT PAYSON TERHUNE

YEARS AGO, when the great annual Westminster dog show at Madison Square Garden used to last for four nerve-racking and disease-breeding days, I made my earliest personal study of what was then called "the police dog" and is now the German Shepherd. Here is the story. It may interest you.

Early on the morning of the show's first day, I chanced to wander over into the southeast corner of the giant auditorium; a section of the Garden far from where my favorite breeds were benched. There I came upon the stalls where a mere handful of police dogs were quartered.

Nowadays, at the big shows, these German Shepherds can sometimes be counted by the hundred. Then they were few. Their great and merited popularity in this country had not set in, although already a few wise fanciers appreciated them.

In a corner bench stood a magnificent tawny-gray police dog, whose owner was grooming him for the ring. The man fell into talk with me as I stood there studying the dog's physique and seeking to familiarize myself with his points. He explained to me the various good and bad points of police dogs, but stressed most urgently their uncanny intelligence and their devotion to their masters. By way of illustration, he made certain his dog's chain was stoutly fastened; then he said:

"Now pretend to strike me, please. Do it as if you meant it."

I obeyed his request, aiming a ferocious, but purposely clumsy, blow at his head. The man reeled back as if under the force of my punch. Instantly the dog went wild with rage, flinging himself at me in maniac fury, straining at his chain to get at the man who had attacked his beloved master.

Now, thus far, there was nothing marvelous in the exhibition. My own dogs, as well as most people's, will resent thus a supposed assault on the man who is their god. I said so. By way of reply, the owner turned to his dog and spoke quietly to him in German—a language I do not understand. Instantly the in-

PHOTOGRAPH COURTESY CULPAUGH KENNELS

DOG OF A NOBLE LINE

The German Shepherd traces his ancestry back for a long, long period. His is no modern strain.

furiated police dog ceased to rave at me. Quivering and with dark eyes aglow, he stood mute under his master's command.

"Now," the man bade me, "put your hand on his head and pat him. I guarantee he will not bite you."

Again he spoke to the dog. I laid a none-too-willing hand on the quivering head and stroked it. The dog stood statuelike under the caress of the stranger against whom he cherished red hatred for striking his master. That master's order made him tolerate the loathed petting. It was a wondrous instance of obedience and discipline. That is the first phase of the story.

Remember, this was on the morning of the four-day show's first day. I did not happen to revisit that corner of the Garden until just before closing time on the evening of the fourth day. During that interval thousands upon thousands of people had drifted past the police dog's corner stall. Thousands had stopped to look at him. A myriad scents had assailed his sensitive nostrils.

PHOTOGRAPH INTERNATIONAL NEWSREEL

THE GERMAN SHEPHERD IS A DOG OF INCREDIBLE BRAIN

Mr. Terhune brands as "absurd" the story that this dog is "part wolf." It has been proved otherwise.

He was asleep as I neared his bench. I stood an instant watching him. As I did so, he opened his eyes and glanced up at me. For a moment his eyes were drowsily expressionless. Then into them leaped memory—and hatred. After a lapse of four days, he still carried in mind the sight and scent of the man who had struck his master. Thousands of other people had passed and repassed without dimming in any way that memory. He flung himself at me, snarling and raging, avid to punish the supposed injury to his owner.

That is all there is to the story. But it makes clear the incredible brain and memory and loyalty of the German Shepherd, as could no other illustration I can think of. Wherefore I have told it at perhaps undue length.

Even as some fool once declared the collie treacherous, so another one has branded the German Shepherd as "part wolf." This is absurd, and has been proven so. All dogs are descended from the wolf or from some wolf-like animal. But the German Shepherd dog traces his canine ancestry back, pure from any wolf strain, for perhaps a longer period than does any other modern dog. From bones and fossil remains, Stephanitz has established the fact that the German Shepherd dog existed, in practically his present form, in 5700 B. C.—nearly 8,000 years ago! No modern strain is this.

For uncounted centuries, in Germany and elsewhere in central Europe, he was the recognized guide and guardian of flocks and herds, caring for sheep and cattle—especially sheep—under his charge, and protecting them from wild beasts and from human marauders. To this day, in central Europe, he is all-valuable as a sheep dog. Says Reginald Cleveland:

"The origin of the German Shepherd dog, though in detail somewhat obscure, dates very far back into the history of the European continent. . . . Remains, older than the remains of Swiss Lake villages, have been found which prove that a dog closely similar in type and structure to the Shepherd of today existed in prehistoric times. There is no fact whatever to support the contention that this dog shows evidence of crosses with the wolf."

For centuries his European breeders were content to develop him along lines of strength and speed and brains which should make his still further an ideal sheep guard. Then, at a later day, it was decided to experiment in these grand qualities of his along lines of police work. Instantly the dog took to this new development. Within a few years he was a recognized and indispensable part of the police departments, his wisdom and fearlessness and physical prowess making him a splendid ally for human

criminal chasers.

There is practically nothing he cannot learn if he be rightly and wisely taught and if his uncanny brain be guided along the desired channels. He is a super-dog if ever there was one. A born watchdog, he brings to his tasks a mentality whose full depths have not yet been plumbed.

The best type of modern German Shepherd dog is described by Cleveland:

PHOTOGRAPH INTERNATIONAL NEWSREEL

MOTHER AND A PROSPECTIVE "COP"

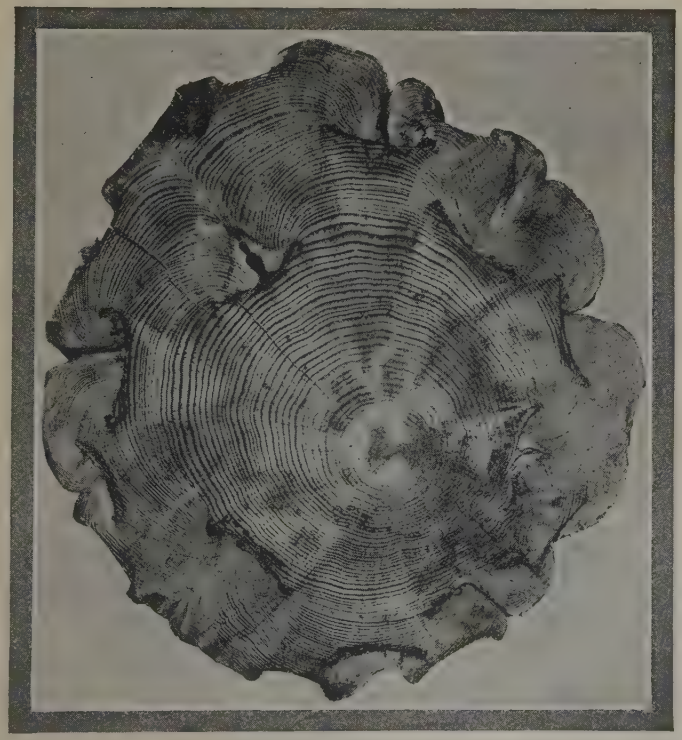
The parent is Othel von Whitenburg of the Los Angeles police force and the youngster one of ten puppies.

"We find an animal of greater length than height, powerfully knit, with sharp angulation in both the fore and rear quarter in order to make possible the long, characteristic trotting gait; a powerful back, built to transmit the propulsion of the hindquarters and carry the dog without effort over the ground; a strong, clean-cut head with sound and powerful jaw, thickly padded feet and somewhat harsh outer coat accompanied by a good undercoat. . . A fearless, bold, but at the same time tolerant and poised character."

If you own the right kind of German Shepherd dog, you can save a goodly sum of money on burglary insurance. Incidentally, you own a dog that is even more anxious to learn than you are to teach. But in teaching a dog you are really giving yourself pleasure.

Long Service

EIGHTY-FIVE years ago, when this maritime pine was forming its first yearly growth rings, the Landes region on the French coast, where it grew, was an unhealthy waste of swamp and sand. The raising of sheep and goats yielded a miserable existence to a scanty, malaria-ridden population. Advancing sand dunes threatened to engulf the small amount of land which could still be grazed or cultivated. Today the district is demonstrating the benefits of continuously productive forests which were planted by the French Government.



The scars of old turpentine faces show that this tree was first chipped for resin when it was about 35 years old. Fifty years later, according to the record of the scars and annual rings, it was still producing resin.

The Landes now supports a population of 1,400,000 on an area of a little less than two million acres, and its advantages as a health resort attract 200,000 visitors each year. From its forest comes a continuous supply of lumber, mine props, and ties; and so thriftily is this small forest managed before cutting that its production of turpentine and rosin is second only to that of the entire United States. The cost of reclaiming and reforesting a little more than one and a half million acres of waste has averaged only $6.41 per acre. Such are the rewards of Nature.

A Sultan in Bronze

By BEN HUR LAMPMAN

WHEN DANIEL BOONE, that gentleman in buckskin, blazed the way to Kentucky we may well assume that by many a camp fire he scattered turkey bones, since in those days—and for long decades afterward—the wild turkey was plentiful in any eastern woodland, from the chill shores of the northern lakes to the warm gulf itself. And though Dan'l never missed his deer, for he shot like a border hero in Cooper, he must at times have had a hankering for turkey. There was this about such hunting—it was done for food, and for food only. And, mark you, had the hunters who followed him, the subsequent generations, but blended their sport with somewhat of the old commonsense of the frontier, the range of a proud and remarkable game bird might this day be nearly as extensive as then.

You were promised a turkey story that is "different." Here it is, from the pen of Ben Hur Lampman, journalist-naturalist of Portland, Oregon, who weaves the fabric of Nature's stories with the threads of golden words. You have met him through his story of Swift, the Steelhead Trout; have known him through other delightful tales, and will know him better in months that are to come.

It has always been so in this America of ours. So generous was Providence that the very amplitude of our blessings led us into ways of error, until at an eleventh hour, or even when it was too late to mend, we recoiled in dismay from the shame that was of our creation. Today the wild turkey may be found, in anything like representative numbers, only in Florida, Alabama, Mississippi, North Carolina, West Virginia, Georgia, Louisiana, Texas, Arkansas, Missouri, Oklahoma, and certain districts of the southwest. Given reasonable protection, the birds would rapidly increase.

But never again shall we of its native continent see the wild turkey in aught remotely comparable to its numbers in that vanished yesteryear, when, as Roosevelt somewhere tells us, those who lacked for bread substituted breast of wild turkey in their wilderness feasts. Or as Audubon, afire with the resolve to study and classify the birds of America, found the turkey when he entered the territory Boone and his backwoodsmen had won and held with the long rifle.

"At the time when I removed to Kentucky," wrote Audubon, "turkeys were so abundant that the price of one on the market was not equal to that of a common barnfowl now. I have seen them offered for the sum of three pence each, the birds weighing from ten to twelve pounds. A first-rate turkey, weighing from twenty-five to thirty pounds, avoirdupois, was considered well sold when it brought a quarter of a dollar."

Yet if we think of the turkey as being known, in those times, only to the settlers of America; if we have in mind but the picture of a red-cheeked Puritan trudging home through the snow, bell-mouthed musket in hand and heavy gobbler tossed across his shoulder, or of some Leatherstocking striding up to the stockade, a brace of birds dangling at his side, we wrong the perspicacity of the Old World. For long before they of Europe learned to burn tobacco they were converts to the turkey, and the haughty cocks ruffled it in their barnyards.

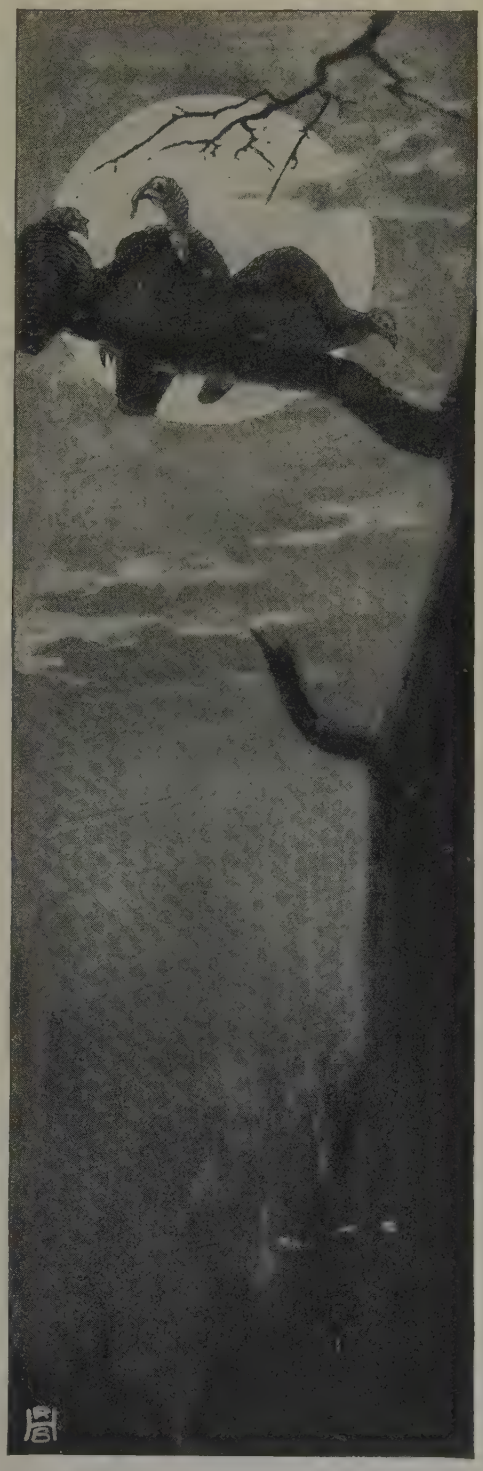
"Turkeys, carps, hoppes, picarel and beer,
Came into England all in one year."

So runs an old rhyme of the year 1524, and it would seem to prove that even then the wild turkey of the New World had been domesticated and con-

veyed to Europe. More, we have the accounts of certain Spanish naturalists of that day, who wrote rather vaguely of a new and wondrous kind of peacock found by the Dons in New Spain and thence transported to the islands of the Spanish Main, where they flourished in domestication and were the prized property of Christian people. The virtues of the turkey commended him to all, so much is certain, for from that time onward he lorded it in England and France, and speedily strutted his way into Holland, where the drowsy Dutch evolved new types of him, such as no western forest ever had seen — white birds, snuff-colored birds, and birds with pompous topknots.

There has been a deal of argument as to how or whence the turkey got its name, and some say that it was by confusion with the guinea fowl, originally called "turkey" because of an erroneous belief that guinea fowl were native to Turkish soil. Some will have it that the christening was much simpler, for, since all turkeys express themselves in "turk! turk! turk!" how logical it was to call them turkeys. Or was the name of Indian origin? There are Indians in the turkey country who call the bird invariably "furkee," and though this may well be a corruption of the name we give it, one should never be quite certain. At all events it is a small matter. By any other name this lordly fowl would still remain his prideful self.

Although the diet of the wild turkey includes mast and many varieties of seeds, you may search the world over to find any gallinaceous bird that destroys more insects. It is a tireless forager and doubtless, in the plan of natural checks and balances, whereby both vegetable and animal pests are restrained, has done mankind much service. One has but to watch a flock of tame turkeys at work in a meadow where grasshoppers congregate, consuming innumerable agents of potential calamity, to understand that they are friends in need of the farmer who owns them—nay, that they are friends of all the countryside. And the habits of the tame bird, despite centuries of domestication, have undergone but little change. Save for minor differences in coloration the flock before you is such a flock as fed in the woodland meadows of Kentucky, when the alert and fearless Boone made that dread hunting ground his own.



"BLACK AGAINST THE MOON"
"The turkey still holds fast to the ways of his fathers."

The call of chanticleer when heralding dawn or rain is, so I have been told, very similar to the cry of the wild jungle cock, so that an untutored listener, on hearing the latter, might suppose a peaceful farm to be hidden in the green and fearful depths of the jungle. And even the city-bred poultry know the dread shadow of a hawk for what it is, though for generations none of their line has felt the cruel talons.

Memories of wildness are by no means eradicated from the cosmos of those birds and beasts we have tamed to domestication. The horse trembles, his eyes dilate, and from his nostrils issues a warning and a challenge when the cougar is near—yet his days have been spent in pastures far from the forest. The dog drowses with his nose tucked under his tail, as did his wild ancestors when they slept in cold and storm. And the turkey, although domesticated by Europeans so soon as the discoveries of Columbus were turned to account, and probably by the Indians of Mexico long before that time, is yet the slave of memory to a greater degree than most. The old ways are his ways. The old tricks serve.

He has never forgotten, in the degree our Leghorns and our Barred Rocks have, the secret, sure delights of river bottoms, where sunshine filters thinly through the coverts, and a bird may hide so cleverly that the roving eye sees only fallen leaves and mottled shadow. He has never forgotten the sere hillside, where stand twisted, dusty oaks, dropping their burden of acorns, and, in accepting the protection

of men, he cannot renounce fidelity to the woodland gods. Thus it is that a warm and pleasant poultry house, with perches properly arranged, where the comfortable chickens dream through a bitter night has for the turkey no appeal. Slouching home for his supper, after a day of profitable gleaning afield, he wings it to the ridge-pole of the barn, or even to an upper branch of some tall fir, where he bulks black against the moon. With centuries of domestication behind him, the turkey still holds fast to the ways of his fathers, indicating by his somewhat stubborn insistence that these are good enough for him.

"UNDER A CEDAR TREE WITH SNOW ALL AROUND HER"

"She had gone for a week without food, and I do not know how much longer she would have sat with the eggs."

In no appreciable degree has the tame turkey sacrificed, on the altar of an easier livelihood, the gift of flight. It is true that at their roosting hour the tame birds evince an amusing indecision, measuring the flight distance with speculative eye, running as though to take wing, hesitating, halting and only after a number of such futile endeavors really soaring clear of earth and upward to the perch. Yet when a tame turkey chooses, it demonstrates beyond question a fair mastery of flight, covering a hundred yards or more with apparent ease. Domesticated geese have not retained in such degree the powers that once were theirs, although tame geese often make short flights. I have been told of instances wherein pure-bred wild geese taught tame flocks the lost zest of protracted flight. Thus, in a farm flock, numbering among its companions several domesticated wild geese, the bulkier tame geese actually were trained by their wild cousins to take flights of a mile or more. And I can but conclude that the turkey, far less submissive to the easy ways of domestication, is much nearer the old days and the old ways than any goose. He tolerates us, but at heart he is as he was three centuries or more ago.

Much of the difficulty found in rearing turkeys has its source in their love of freedom and their stubborn trust in natural instinct. For in confinement the young turkeys do not thrive, but sicken and die, without discernible cause. It is as though nostalgia claimed them, for when returned to the open, and left to their own happy devices, their maladies vanish and they become the alert, confident, contented birds they were intended to be, gaining rapidly in weight. It is not a question of food in abundance, nor of cleanliness, for that matter—since both food and pen may leave nothing to be desired, so far as one may determine. It is a question of — what? Perhaps the answer is hidden in the heart of the turkey, who, foolish as he may seem to the dull eyes of his captors, knows what is best for him and his.

And wildness is in the heart of the hen turkey when her time to brood is near. She is not pleased with the straw nests of civilization, the shelter of a shed, the guardianship of the vigilant watch dog. She must away to a dear and chosen spot she knows of, secret as the nest of a grouse, there to deposit the eggs and dream over them. It profits one little, in all ordinary cases, to attempt to dissuade the hen. As in the matter of roosting and the choice of range, she is incurably obstinate. She is the wild bird again. You must search both thoroughly and cleverly to discover the nest she has "stolen." How oddly we contrive our phrases, until the truth often is warped and twisted! Can it be possible for a turkey to steal a nest, when notion, nest, and freckled eggs alike are hers? A manifest absurdity.

I spoke not long ago to a friend of mine, who raises turkeys, of the ineradicable wildness of the mother bird in her nesting. Whereat he lighted his seasoned pipe, puffed it to a glow, and held forth on the topic of turkeys. I recall that he said the hen turkey was the most secretive of birds, and he doubted she had lost the perfect technique of natural art and intuitive artifice which once were hers—when all the predatory creatures of the wilderness, man among them, were pitted against her hope of motherhood.

"When it comes to nesting," said he, "the old

turkey hen shows her ancestral wildness. It always takes considerable time and watching finally to locate the nest, so neatly and wisely has she hidden it. Domestication may have changed her habits in some ways, but only slightly, I believe. A year ago I had one hen that went off in the timber to nest. When I found her, after days of hunting, there were nineteen eggs in the nest—more than she could cover—and she was yet laying. And she kept on laying until there were twenty-seven eggs. I took some of the eggs away, but my profaning hand could not be suffered, and she left the nest.

"Last year I took away the eggs from another hen because it was too late in the season. It was toward the end of the summer and there was frost in the air of mornings. About the first of December I noticed this bird had disappeared, but it did not seem likely that she would try to raise a brood in mid-winter. I had given her up for lost when one day she returned, and as I watched her she took flight from the top of a hill, sailing off through the trees by the river. I followed as rapidly as I could. Though I hunted for two hours I did not find her.

"This was December 13. The following day we had a snowstorm, and you will remember we had some very cold weather from that time on for a fortnight. The hen did not return, and I was almost certain she was dead. But on December 20, searching again along the river, I found her sitting on her eggs, under a cedar tree, with snow all round her. She had gone for a week without food, and I do not know how much longer she would have sat with the eggs. They were nearly ready to hatch, but to permit them to do so would have been cruel. I took them away from her and shut her up for a day or two, and at the end of her captivity she was ready to resume her perch in the firs."

The wild turkey will never disappear entirely from the lists of American avifauna. Diminished in numbers and restricted in range, it will nevertheless survive. An awakened public sentiment, tardily but thoroughly aroused, is one's warrant for this pleasing conviction.

It is difficult to visualize a time when the wild turkey lived from Canada to the Gulf, yet with reasonable protection and the restocking of suitable ranges it might once again become a familiar bird.

Whence Comes the Burl

By MADGE MACBETH

MANY of our forest trees show a noticeable irregularity on the trunk, a swelling of varying sizes, which is called a burl. This peculiar development has not been explained to the satisfaction either of botanists or entomologists, but the layman, always ready to step in with his theories, suggests that it is caused by a parasite, or perhaps by adventitious buds.

The parasite theory has a flaw, in that no parasite has ever been found. No matter whether the burl is large or small, old or young, the parasite — if such there were — seems to have escaped before cutting is accomplished.

The adventitious bud theory, though not completely satisfying, has its good points, especially when one remembers that a tree, unlike a human being, grows from the outside in; that is, it puts on its coat from the exterior, instead of growing outwards, as we do. A tree adds layer after layer to itself, as an oyster coats its pearl.

Now if an abnormal growth started in ever so small a way and year by year a layer of bark was spread over it, you can see that before long the tree would boast of an enormous burl. I have seen some twice as large as the trunk itself.

In the accompanying photograph may be seen the trunk of a tree standing near the hospital of St. Stephen, at Fort Yukon, Alaska. An Indian patient occupied his convalescent hours by carving the burls and converting the post into a very fair totem pole.

ONE DOES NOT ACCUSE FRANCE OF WASTING FORESTS

This is a photograph of a soft-wood forest in the French Alps which is being used each year for cutting of Christmas trees. The custom originated in Germany, one of the nations most careful of its forests.

Christmas Trees? Why, of Course

BEFORE many days, in hundreds of thousands of homes, small firs, spruces, cedars, pines or hemlocks will stand bedecked. Clad in their gay trappings of tinsel and varicolored lights, bells and cones and what-nots, they will grow jauntily from a ground strewn with interesting boxes and packages, wrapped in white and decorated with ribbons and stickers. Yes, probably some five million trees will come to serve thus. Cut from here and there, they will play their brief rôle, die and be tossed away. What of it?

The Christmas tree is the Maypole of life's winter holiday dance. Without it the day of days would not be complete. It is the shining star of the youngsters' day. Pressed, no few oldsters would admit that Christmas without the Christmas tree is like turkey without dressing.

Each year, however, a cry is raised that to have Christmas trees is to endanger our waning forest resources. Last year, when this annual cry was heard, Mr. Charles Lathrop Pack, president of the American Tree Association, answered: "Conservation is wise use." A conservationist whose sincerity and balance cannot be questioned, he declared that the children should have their Christmas trees. Forestry, as a profession, is of like view, holding the Christmas trees to be proper by-products of the forests.

This is the point. A stand of timber, to grow and wax strong, must be thinned out—weeded, as a garden is weeded—to give the plants a chance. It is these thinnings that can, should and in no inconsiderable measure do provide our Christmas trees. Let the energy used in condemning the practice of using Christmas trees be directed to urging this procedure.

There is another phase of Christmas tree use of high economic interest. Trees at retail are comparatively expensive. The seasonal demand is sure and good. When such conditions prevail in any business line, there is incentive to produce. Christmas trees can be farmed as a crop and produced, at a neat profit. Such a proposition provides a profitable adjunct to the farm, a useful way of putting otherwise loafing acres to work.

For example the Department of Forests and Waters of the State of Pennsylvania has recently issued a significant bulletin along this line. It is pointed out that more than 500 carloads of trees are imported into the state each year around Christmas when they should be grown in the state. The bulletin points out that trees from six to nine feet high are in great demand, and can be grown on moist and fairly fertile lands, 2,700 trees to the acre. With comparatively little care after the young trees are well under way, it is pointed out, a yearly cutting can be made netting the owner from $150 to $250 an acre year after year, and still there will be enough left to form the mature crop. It would be ideal if a good proportion of our Christmas trees were so raised.

There are certain phases of Christmas-tree gathering that should not only be condemned but should be rigorously prosecuted by law. The outstanding is the petty thievery of other people's property in young coniferous trees. It is the same sort of thing that prevails in summer with the filching of plants and shrubs, apples and pears and other wayside products growing on private property.

Against the man who steals a tree from someone else's lawn or a woodlot and carries it off in his automobile, there should be prompt and effective action. He is nothing more than a common thief, regardless of the horsepower of his car. Against the larceny of the man with a truck who clandestinely steals the best young trees from a farmer's woodlot, or other property, the law should take its course, quickly and surely.

In the larger commercial gathering of Christmas trees, legally done by lease or purchase, education is necessary. The scientific cutting for thinning purposes should be encouraged, specified in the lease of land for this use and demanded by common sense. The practice of topping large trees to obtain the pretty crown should be outlawed.

Education is beginning to bear its fruit. The problem of Christmas-tree supply—and it is not a serious problem from the point of view of the larger timber supply—is working itself out. No doubt there is much truth, both logically and actually, in the saying that "you can't have your cake and eat it, too." But it does not follow that you cannot have your Christmas trees and your forests, too.

Cats and Motherhood

THERE is always a vein of wonderment running through, and vitalizing, those semi-occasional newspaper stories which tell of the cat as a foster-mother. A cat has taken silver fox cubs and has lavished upon them that extravagance of maternal affection so characteristic of the mother cat in her happiness. Or the story may tell how some old tabby has driven a scolding hen from a newly hatched brood, and has attempted by cajolery and caress to convince the chicks that she, and not the hen, is their beloved matron. Such tales as these are not uncommon in our newspapers, and the frequency with which they appear should long since have persuaded us—for there is no question of their authenticity—that these strange maternal demonstrations on the part of puss testify to a better character than ever we have given her.

MATERNITY IS STRONG IN TABBY

Many are the stories of the cat taking as her brood the young of others and caring for them as tenderly as her own.

While one would not say that the result must always be felicitous, it is true that tabby will often, when her own kittens are small and helpless, or when a cruel fate has claimed them, adopt the young of those antipathetic clans which normally are her prey. Infant rats and rabbits move her to an ecstasy of maternal delight and solicitude, nor does the most watchful eye detect an act of preference for her own children. That the foundlings are small and futile, requiring both sustenance and protection, is enough for the mother cat. She draws no line of difference, her tongue is as ready to lave one as another, and her pride in each is glowing and visible. And there are few mammalian mothers more susceptible to that sweet flattery which is expressed by the fondness of others for the little family. True, she glances at you, as you bend above her treasures, with an eye that urges you to gentleness, but the same glance is melting in its warmth of affection. As you stroke the infants her purr is deepened to a mellow snore, and the fond eyes close blissfully. It is her great moment.

Startling anomaly. Perplexing contradiction. Can this be William Blake's insatiate creature from the forests of the night? A footfall not heard in the stillness, a presence so dread that it is felt ere it is seen; yellow eyes that burn with fires unquenchable. The cat. She is all love and gentle manner now, and will be so unless danger draws near. And then, why, then the mastiff is not too huge to escape her furious valor; nor would a mastodon affright her. As a mother, brave and proud in her motherhood, the cat needs no tutoring. If it is a certain phase of madness that she manifests when she gives suckle to the helpless young of her own prey or her own enemy, we are nevertheless moved to admire and applaud it—for it is a tender madness and seems itself a spark from the dream of divinity.

There are critics of the cat who allege that puss is no better than a merciless mechanism for the creation of fear, and the infliction of pain and death. Since it treats of a cruel subject perhaps it is fitting that this opinion should be fully as cruel. For certainly it neglects to observe the cat, and passes judgment without trial. A cat deprived of her young sometimes breaks her own heart with grief and elects death rather than to endure loneliness. Does this argue that the cat is selfish? You may twist it that way if you choose, but it is an admirable selfishness. It commands our pity and compels our respect. Truly we may say, poor puss.

Making Up the Christmas List

As in previous years, many members will wish to give NATURE MAGAZINE as a Christmas gift. A remembrance of more permanent value and constant enjoyment would be hard to select. Write us for Christmas cards, order blanks and any advice or service that we may be able to render you in making up your Christmas List.

In Quest of the Howling Monkey

By PAUL GRISWOLD HOWES

(PHOTOGRAPHS BY THE AUTHOR)

I HAVE walked a mile or more in the strangely cool air of a tropical dawn. The course has taken me over a dozen small sandy hills and through their intervening valleys, grown with tangles of razor grass and trumpet trees. It is a tiring trip even to the veteran who has learned to commute thus from camp to the high jungle beyond, but the walk owns its diversions.

Here and there crossing the trail are fresh animal tracks, some of the puma, others of lesser animals as tiny as mice. An unfamiliar snake is sometimes seen lying idly among the leaves. Countless brilliant lizards are venturing forth upon another sweltering day in the second growth. One darts from behind a log and snaps up a mother wasp just leaving her underground nursery. Another rushes here and there grasping the lady of his choice by the tail. Still another runs a few yards and waves its front foot nervously, a common habit among these creatures, as though beckoning one to follow. There are army ants journeying to their lair of the day. Rarely, one startles a deer or comes upon a lovely spotted fawn in the rising, winding, falling path.

At length I leave the sand-blown hills and second growth where we labored so gladly in the making of the trail. The sun has risen. Another tropical day is upon me and gladly I plunge into the cool twilight of the British Guiana forest.

Here it is all dripping with the dew, and our mood changes with the scenery. Under foot the leaves are soft and friendly and wet like sphagnum moss in a northern swamp. It is still dark enough for bats. They are about in numbers and sail clacking back and forth over one's head. Above are the gnarled silvery limbs of forest giants, twined about with lianas and "monkey-ladders," each crotch supporting some lesser plant whose air roots drop strangely straight to earth. Mosses grow on twigs and leaves, and tiny wasps weave their gossamer nurseries among them. Here and there is the flash of morpho-wings, great azure butterflies who thus make known their insect desires. Red and blue macaws screech overhead. Below are the great vari-colored jungle trunks, flinging out knife-like buttresses to support the light-striving branches a hundred and fifty feet above. From the depths of the valley ahead come the mournful voices of tinamou and wood dove. Nearer, the quadreille wren's song thrills us with its incomparable sweetness.

It is virgin forest here, scarcely touched by human hand, sheltering secrets of evolution, and life stories that will never be unfolded. All noises are greatly exaggerated. One learns quickly the difference of proportion between a sound and its source. We hear a crashing noise somewhere above, followed by a resounding report. One turns the

FULL FACE OF THE BEESA MONKEY

These jungle denizens are great jumpers, leaping about in the highest branches.

"My interest in science did not 'begin.' I was simply born that way and cannot help doing what I do," writes Paul Griswold Howes, Curator of Natural History at the Bruce Museum, Greenwich, Connecticut, the author of this entertaining article. Mr. Howes is well known to readers of NATURE MAGAZINE. They will be interested to know that he is sailing in December for Dominica at the head of a party which will establish a permanent laboratory and biological station on the island for the exploration of the Leeward Group. The project is being financed by Mr. Howes and others. From this work will come several interesting and entirely new articles for NATURE MAGAZINE.

head startled expecting to see some huge limb tumbling earthward, breaking others in its course and carrying them along, only to find a twig or falling nut the cause of it all. The hum of the metallic jungle beetles, the woodpecker signalling to its mate, even the dying leaf and falling blossom herald loudly their journey back to the earth from whence they sprung. When a twig falls one looks for a limb; when a tree lets go it is as though the earth itself were rent apart. Until the echoes die away among the hills and valleys, one stands awed, waiting.

Sharp noises in the forest invariably bring an avian protest. The crack of a rotten stick under foot, a cough, the discharge of a gun, brings an astounding three-syllabled whistle from a dozen hidden perches. It pierces the jungle like a flash of lightning, suddenly tremendously clear; leaving one with a ringing sensation like that which follows a sharp report. This is the song of the Gold Bird. Beneath his perch one should find a nugget, so the Indians have it. It is a grayish bird, perhaps a little smaller than a thrush. I have often been puzzled to know whether the bird really sings as loud as it appears to the ears.

THE RED HOWLING MONKEY

Hardly a beauty in any event, his mouth is stained deep purple from berries, adding to his lack of facial charm.

Gradually one's ears become attuned to the jungle. The crashing of a falling swori nut makes no impression, and the beast-like yowl of the calf-bird is now passed by with contempt, where before it brought our rifles into readiness for a worthy trophy. Even the probability of a sleeping bushmaster coiled in the trail ahead loses its original importance. There is one voice of the jungle, however, that is always exquisitely inspiring. One can listen to it a thousand times, but always a strange sensation passes through the hearer, a feeling of awe; admiration and wonder! To be sure the creature is harmless for all its strength and ugly face. Yet one experiences something that is never forgotten when the Howling Monkey sends his terrible challenge echoing through the forest.

They are splendid animals traveling in troops with an old bull as leader. They are very powerful, with great naked hands and bulging leg muscles developed in clinging and leaping among the highest forest branches. The tail is used as an extra hand and is quite naked and lined with heavy skin for a space of several inches on the under side near its tip. The body is beautifully furred with long silky hair which is rich golden brown, tinged with shades of red and orange. In the old monkeys, particularly the males, which attain perhaps a weight of thirty pounds, a heavy beard grows about the jaw, coming to a point along the middle of the chin, which, coupled with their big fleshy lips, hideously fruit-stained teeth and deep set eyes, give the creatures a wild and ferocious appearance.

The roar of howlers carries for miles through the forest. It is all but impossible to describe the sound. Starting with a series of terrific belches, it develops into a deep-toned roar with the quality of a lion's voice. It rises and falls, trembles and echoes through a dozen moods. There are sadness, melancholia, hatred, rage; all are in that bellowing call. The sound freezes one spellbound in its grandeur, leaves one shaking with excitement, unbelieving always of its source.

In April I first started searching for these monkeys, or baboons as the natives incorrectly call them. By following the succession of jungle fruits they were easily located, as almost all monkeys are very fond of the sweet forest varieties. The troops of howlers were in the very highest branches, from one hundred to one hundred and fifty feet above the ground and chiefly in the tallest section of the surrounding jungle. Here many great trees were in full fruit in April, and the animals were feeding greedily, throwing considerable to the ground

uneaten. At this time, very young monkeys were being carried by the females. They would cling to their mothers like babies, and except for their long tails they were indeed human-looking little creatures.

There were several methods of locating the monkey bands. If one heard them howling in the early morning, it was not so difficult, if one were patient and stealthy, to work gradually beneath them, keeping sharp watch of the surroundings in order not to become hopelessly lost. The noise of dropping twigs and fruit-pods, if continuous, generally meant animals, but the surest way of knowing of the howler's presence is by the odor that it leaves. This is very distinct and powerful and, once learned, is never forgotten. I could smell them some distance away and often ran down troops in this way.

I found that they sleep a great deal in the tree tops completely hidden from below. Twice I sat down in the silent exquisite forest where the odor of the howler was persistent, and although I could not locate a single animal, I knew that they were either resting silently above me or had very recently been there. After some time, having given up the task of locating them with my eyes, I discharged my gun into the air. Instantly monkeys large and small appeared on every side and made off in terror, their startled grunts echoing through the forest.

A minute later I could hear the coming of a rainstorm, a strange and characteristic sound in a great rain-forest such as this. Miles away as yet, and giving one time enough to collect a few spiny palm leaves for a shelter, it sounded like the roar of a train passing over an iron bridge. Nearer and nearer it came and louder grew the roar. Then all at once came the deluge, and it rained as only it can in the jungles of South America.

This rain, of course, made the limbs of every tree very slippery. A little later I witnessed a sight for which I may thank the storm. I had located another troup of resting howlers and had discharged my gun again to stir them up. A young one, racing for safety, lost its balance, slipped and fell many feet, then caught a lower limb with its tail and thus saved itself. It was a remarkable episode which illustrated the value of the howler's strong prehensile tail.

Some miles from where I made most of my monkey observations I witnessed the attack of two very large howlers upon a third, a female that had been wounded by a bush negro. There were perhaps fifty monkeys feeding in a group of trees bearing a small berrylike fruit, very soft and fleshy, and containing a rich magenta juice that stained one's fingers like ink.

SHELDON

A PATRIARCH OF THE JUNGLE

Beesa monkeys are the old men and women of the jungle, traveling always in family parties.

Most of the monkeys were small sakis, the most humanlike and interesting of all their tribe in Guiana. They swarmed in the surrounding vegetation, chasing one another, squabbling, feeding and amusing themselves as they do in the zoo.

I watched them for a time when I was startled by a shot, and saw the big female wince and roar with pain. Apparently forgetting danger, two others immediately jumped upon the wounded one, just as dogs will sometimes do when another, even though a companion, is hurt. It was a thrilling sight there in the full glare of the sun, their coats shining like fire, to watch the animals' instinctive desire to do away with a useless member of the tribe.

My hunts brought me in contact with many other interesting sights. Once I watched a troop of howlers crossing a swamp by their aerial bridges. The entire band were making considerable speed along a great naked branch some seventy feet above the ground. Next to the last animal in the line stopped short in the center of the bridgeway, upon discovering me. As she did so, a young monkey following her on the run, and respecting her judg-

ment as final, ran head-on into her, losing his balance for a second, then scampering over her head and running on to join the rest of the monkeys who were now out of sight in the forest.

There were many other monkeys besides the red howlers. Black capuchins were occasionally seen in large and small troops. A mother capuchin was observed with her baby in the swaying top of a fruit tree. She would allow the young one to venture out upon the tiniest limbs, far too delicate to bear her own greater weight. There delicious fruit clusters grew beyond her reach. The youngster would gather a luscious handful, whereupon the old one would pull him in and promptly help herself of his hard-earned spoils.

Beesa monkeys, those old men and women of the forest, were not so common. I saw them in small family parties. They are marvelous jumpers, leaping among the highest branches quite unconcerned of dangers.

A SAKI MONKEY PET

These little jungle fellows travel in groups talking continuously to each other in soft whines.

The little sakis were very numerous, and young ones brought in by Indians made delightful pets. To observe these little creatures in the wild, I found it best to locate a monkey route, that is to say, a place in the jungle where they were accustomed to travel to and from a food supply, or other lure.

In such a place I constructed a shelter of palm leaves just large enough to sit under and be unobserved. By the third day after completing this shelter, a pair of jungle doves had set up housekeeping upon its roof and soon had a little hollow filled with dead leaves and two pure white eggs.

I could hear the sakis coming some time before they put in an appearance. They talk continually to one another in little soft whines and go up and down the trees as they progress. The howlers never come down from their lofty perches.

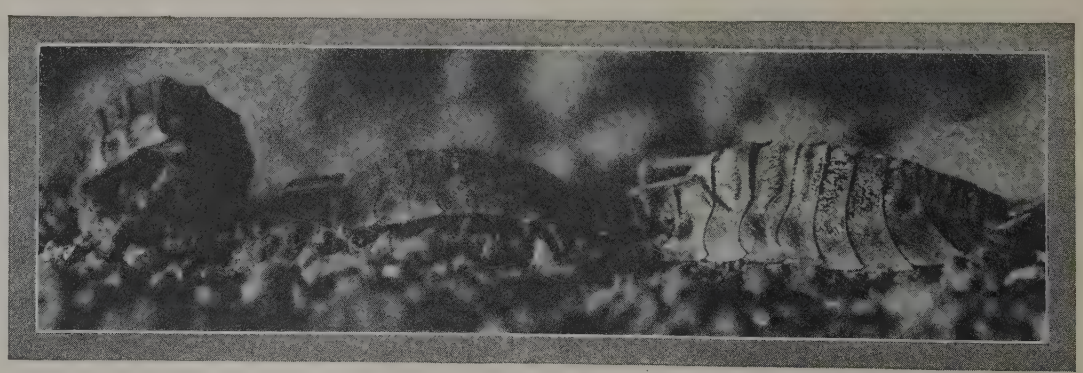
A harsh coughlike sound is their warning cry, and when this is sounded by any individual the entire troop instantly crashes off through the branches in wild flight. From my shelter I watched mothers with their young, observed mating antics, saw the animals at play and studied their feeding habits.

To be alone and quiet thus, in the great forest, with all its beauties and mysteries, with real wild monkeys in their natural home above me, with trusting wild doves sitting upon their eggs within a foot of my head, and the excitement of unexpected things that might appear at any moment ever in mind, is indeed one of the sweetest experiences that may come to a naturalist.

Of all my impressions of monkey-land, the one that is most indelibly stamped in my memory is that which I received upon looking up through the great forest branches and seeing my first big band of howlers, brilliant, awesome, like weird red-furred little men moving about leisurely in another world.

Consider the Pill Bug

THESE Sow, or Pill Bugs are very common creatures, found under stones and boards everywhere, and under refuse in salt marshes. In fact, they are not bugs, or even insects, but are more nearly related to the land crabs; they belong to the Crustacea. At the left of the picture an individual is shown rolled up, and it is from this habit, which they occasionally practice when disturbed, that they obtain the second name given above. They feed upon decayed vegetable matter and are creatures of quite ancient origin.



Cunila, Jack Frost's Favorite

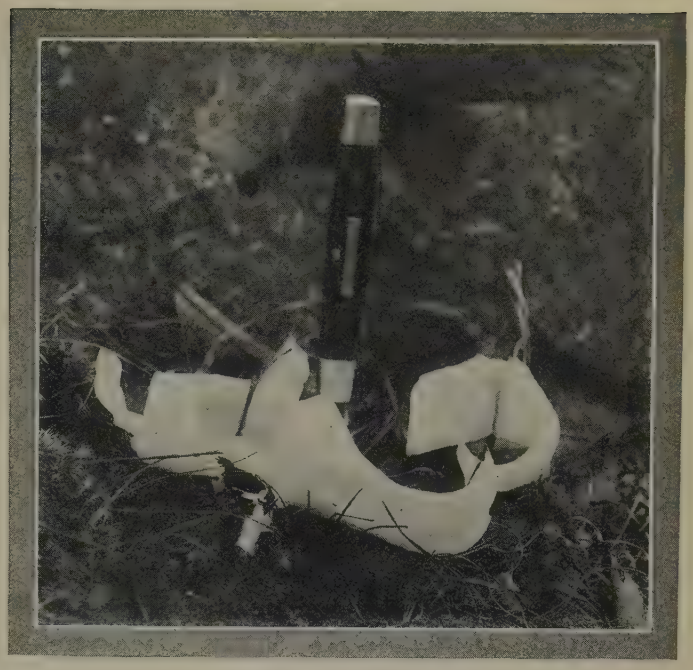
By DR. W. J. HUMPHREYS
Physicist of the U. S. Weather Bureau
(PHOTOGRAPHS BY DR. L. W. HUMPHREYS)

DID YOU ever see the Christmas ribbons Jack Frost ties about *Cunila?* If not, and if you are a lover of the beautiful in Nature, then hunt for them any cold morning of early winter, except when they are hidden by snow. Where? Almost anywhere along the whole Appalachian system and its borders, the home of *Cunila.* It is *Cunila origanoides,* to be exact—Jack Frost's especial favorite. A few other plants receive a little of his ribbon gifts, but they are mere scraps and ends compared with the lavish adornment of his particular pet.

"Cunila" is the old Latin name of a plant of some kind, no one knows what, while "origanoides" means like "origanum" (wild marjoram), whose name, also Latin, was adopted from the Greek in which it signified delight of the mountain. No wonder, then, many of us prefer to call this aromatic herb by some simpler name, such as stonemint or American dittany.

But call it what you will, this plant, about a foot to eighteen inches high, and having in midsummer many small purple flowers, is common in the eastern portion of the United States. Its somewhat angular stem has a pithy core and a woody shell threaded with long and large sap ducts, the supply tubes during the growth of the ice ribbons.

The stem dies in the late autumn, but the roots live on, and the sap tubes, through capillary action, remain full of water up to some inches above the ground. Then when a freeze sets in, from one to several, but usually two, ribbons of ice start growing out from the side of the stem. They appear to come from a wide crack or slit, although this is not so. The ribbons are about as thick as the blade of a table knife, from half an inch to two inches broad, and of varying lengths. Those shown with the key were each about seven inches long. An occasional ribbon is nearly transparent, but the great majority are snow white. All are fibrous with a silky sheen, the fibers running lengthwise of the ribbon. Nearly all, too, are gracefully curved. At a little distance they look like so many large white flowers.



JACK FROST, DECORATOR

Most ribbons are snow white, and all are fibrous with a silky sheen and fibers running lengthwise.

CUNILA, BEDECKED IN WINTER RIBBONS

A pair of ribbons, each about seven inches long. The key shows the comparative size of these decorations of the winter.

The first careful study of these ribbons was made by the physicist, John Le Conte, then at the University of Georgia. His study was of *Pluchea,* or fleabane, however. He found that they are owing neither to frost deposition nor to physiological action, the stem of the plant being dead, but, as well as he could judge, to progressive freezing, at the surface of the woody portion of the stem, of water brought from the ground

by the porous central pith and forced out along the medullary or pith rays. He also showed that the ribbons did not grow out from perceptible rifts or longitudinal cracks in the stem.

More than sixty years passed after Le Conte's studies before this subject was again seriously examined. This last investigation, by W. W. Coblentz, is the most elaborate yet given to the formation of these ice ribbons. In the main Coblentz confirmed the earlier conclusions of Le Conte, but showed that the supply of water from the ground is by way of the large sap tubes in the thin woody shell of the stem and not the central pith. He also showed that the ribbons form readily on dead stems stuck in damp soil or vessels of water. This proved that the root system is not essential to, and presumably takes no part in, the supply of moisture. He found, too, that the ribbons begin as a row of closely spaced hairlike ice crystals along the stem. These are soon bound together by a connecting web of ice, and the whole grows out to a greater or less extent, a fringe at first and then a ribbon of ice. Furthermore, the ribbons form repeatedly, freeze after freeze, at the same place on the stem.

Apparently, then, it is established that the ice ribbon is produced by the freezing of water that rises, by capillary action, in one or more sap tubes. Coming to the surface mainly through a row of minute openings, this water rises from the soil directly and not by way of the live roots. But is the water that is fashioned into a ribbon supplied by a single tube or by many? What is the nature of the openings from the supply tube or tubes to the surface? Are they finer capillaries inherently present, or mere ruptures or partial tears incident to the drying of the dead stem, or owing indeed to some other cause? Why does not the water in the capillaries also freeze? Is this owing to the liberated heat of fusion, to impurities that the process of freezing tends to concentrate within the supply tubes, to both of these, or even, in part at least, to some entirely different factor? But why investigate such trivial matters? Because they occur, and we do not fully understand how. Such things as these, and they are all about us every day and everywhere, if we will seek them, make Nature an endless, fascinating study.

Seeds of the Arbor-Vitae

By Robert Sparks Walker

THE ornamental, woody plant known as the arbor-vitae, grown for its hardy evergreen foliage and formal habits, blossoms and produces seed each year, and yet there are many people who pass it by in early spring unseen, unnoticed!

In springtime the arbor-vitae may be observed to wear a green flat foliage dress profusely flecked with tiny yellow spots. These tiny yellow specks are nothing more than the blossoms of the arbor-vitae and when the pistillate flowers have been fertilized, the seed pods grow green and the foliage is rather indistinctly flecked again with little warty-looking pods.

In some varieties the little seed pods or cones

stand upright, and have wingless seeds. When the seeds are matured the woody pod bursts open and the seeds scatter out on the ground and some of them may be carried away by the birds.

Though the receptacles which bear these seeds are really cones, they are not easily recognized as such, since the fleshy scales forming them are few in number and are very closely joined.

These little seeds have a sweet taste and contain much oil. Young plants are easily grown from these seeds, and when planted in the spring they soon germinate, yet some horticulturists get more satisfactory results with certain varieties by growing from cuttings.

Stalking Moose

(ILLUSTRATED BY A FULL-PAGE INSERT IN COLOR FROM A PAINTING BY R. BRUCE HORSFALL)

By WILLIAM L. AND IRENE FINLEY

NEAR the mouth of Trapper's Creek in the upper Yellowstone, a beaver dam stretched from the edge of the pines out into the willow bottoms. Two saplings, freshly fallen, lay in the shallow water where the insistent "Chop! Chop!" told that a beaver was eating his evening meal. Another was rippling an ever-widening "V" in the smooth surface of the pond. Suddenly there was the sound of some larger animal crossing the bog. There was a slosh of water in the willows and the sucking sound of hoofs treading the mucky border. Then broad, palm-like antlers thrust through the leafy screen. A bull moose stood framed against the sky.

For a few moments, all was silent. The beaver stopped his meal and sat up. The trumpet-like ears of the moose were alert. His nose caught the whiff of something suspicious in the air. It was man scent, for up the slope behind a pine two eager-eyed watchers were crouched. A few minutes later, his suspicions allayed, this quaint, ungainly, prehistoric-looking animal plowed slowly out into the pond. Again he grew cautious. Then, spraddling his front legs, his ponderous head disappeared under water. Up it came with weeds hanging from his mouth and little streams trickling from his shaggy hair, and he munched his succulent supper in the cool of the summer evening.

What a tale of prowess he might tell, this giant of the deer family. No record even from far back ages shows his equal. His long line of ancestors came down through the centuries, feeding and fighting, surviving where other species were blotted out. How did he survive the saber-toothed tigers, great wolves and bears? Perhaps at that time he had not yet reached the zenith of his orderly evolution, for moose there are today that weigh fourteen hundred pounds, measure eight or nine feet in length and stand seven feet high at the shoulders, with over a six-foot spread of antlers.

The very reason for his survival may lie in the splendid adaptation of his ungainly body to environment. His widespread massive antlers might seem cumbersome, yet they were his means of protection. But to bear such a weight, his neck had to be short and heavy-muscled. He was built more for browsing, and by the very weight of his body he straddled and bore down a sapling to bring the tender leaves within his reach. With such long legs, he cropped the grass easier by kneeling than by standing. He had learned long ago, however, that in the marsh his front feet mired in and his muzzle came within reach of water weeds. His natural love of water led him into the joy of sousing his head deep in search for food. This marsh-feeding habit may have been his salvation in an era when big predatory animals hunted the fields and forests.

The faint glow of color in the western sky was mirrored in the water. This canny-looking colossus loomed up in front and we, the two watchers, like some wild creatures of the long past, were crouched behind the pine. The profile of his square-ended nose, the pendent bell on his neck, the hump of his shoulders, the scoop-shaped antlers and sloping body made the most impressive, unearthly wild-animal picture we had ever seen.

It was to picture just such a sight as this with the camera that

"SHOT" BY THE CAMERA

Stalking moose with celluloid ammunition is hunting that demands patience and perseverance.

we left the main line of travel with a pack outfit, following the trail on the east side of Yellowstone Lake leading to the south boundary of the park. We had passed the wide willow bottoms where the upper Yellowstone River flows into the lake and threaded our way along the trail that follows the side of the mountain above the valley. How I had longed to stop and get out into the marsh. Some places looked as if they had been ditched and dyked by an earlier race. In fact, this was the case, for it was the ancestral home of beavers. We saw the remains of old dams and ponds that had filled up and changed to meadows. Willow thickets had flourished and been harvested. Patches of big pine timber still grew on higher spots that were now islands. On the broken-off top of an old pine was the castle of an osprey, a huge nest enlarged a little year after year, a commanding site surrounded by many osprey traditions of the past. Where the trail skirted the pond or came nearer the river, flocks of mergansers flapped away over waters that teem with fish. I looked eagerly out through the vistas of pine trees where the timber-fringed Rockies drop into wide meadows, soft and spongy with succulent growth, a country made more for moose than man.

PHOTOGRAPH BY FRANCIS DICKIE

MOOSE ON A TREK ACROSS THE SNOW

A remarkable picture of those shy and wary animals on a march probably in search of better feeding grounds in the snow-covered country.

This first night we had camped near Trapper's Creek. Ranger Jimmy Brooks and I set out early the next morning before it was light enough to photograph. We had spied an old bull moose, perhaps the one of last evening, feeding in the pond some two hundred yards out from our trail through the pines. "We'll stalk him," whispered Jimmy. So we crept down to the edge of the willows and followed the path of moose tracks around to a point where we could get a closer shot. About fifty yards ahead, we heard a movement in the bushes and came face to face with a cow moose. In the excitement, I ran into my first predicament. I was setting up the camera. The ground was so spongy that even when I rammed the tripod legs down as far as I could, there was no firm footing, which is necessary for good motion pictures. The cow's ears stood straight out and she stretched her neck in curiosity. But just as I was ready to turn the crank, she grew suspicious and moved out of sight. We pulled up the tripod and trailed after her cautiously, and ran into three more moose. Wherever I tried to set the tripod, the fringe of willows intervened, so the finder showed merely a black spot with the principal parts of the moose hidden. The willows moved on one side, the water splashed on the other. We were in the midst of moose where a gun would have brought them down at twenty-five yards, yet we couldn't bag them with a camera. Coming in sight of the pond where the bull was feeding, we found his suspicions had led him off into the thickets.

A mile down the trail from camp was a pond close to the pine timber where a cow moose was feeding. Keeping behind the trees and crawling a part of the way on our hands and knees, we were in good range at seventy-five yards. The cow fed quietly in the open water. As her head went down out of sight, I set up the tripod and quickly screwed on the camera, but she was up before I could focus. She had not seen us. She started eating again. The film was buzzing through the sprocket wheels when her head came up. There was only a low whirring, not more than the soughing of wind through the pines, but she jerked her head around and plunged through the pond into the willows.

This moose of the Yellowstone is called the Shiras Moose and differs a little from the common moose of the East and the Alaska moose, the larger and darker form, of the North. Horace M. Albright, superintendent of Yellowstone National Park, esti-

mated from four to six hundred moose in the park, living principally in the southern half. Our American species of moose are similar to the elk of northern Europe and Siberia, but larger in size. They range in our northern forests from the mouth of the Yukon south and eastward to northern Minnesota and Maine. The Shiras Moose is somewhat segregated, ranging along the Rocky Mountains into Wyoming, further south than any other species.

We moved on and camped at the base of the Trident, the three great escarpments of rock that jut into the sky on the east side of the upper Yellowstone near the boundary line. With a lunch and cameras packed on one of the horses, we forded Thorofare River to stalk moose along these wider and more open meadows south of the junction of the two rivers. Jimmy, who had ridden on ahead, returned. "Over here about a mile, a cow moose is coming through some low willows up the Yellowstone River." Under cover of some bushes, we unpacked. Jimmy slung the pack-sack with the camera on his back. I balanced the tripod on my shoulder and keeping in the edge of the willows, we watched the moose through our field-glasses.

COW MOOSE AND CALF

The youngster, at sight of humans, seeks refuge behind the mother before they both take flight from the intrusion of man.

"Here come two old bulls," whispered Jimmy. They were browsing along a hundred yards behind the cow. Soon all disappeared in a long narrow patch of pine timber that bordered the Yellowstone. Waiting a while after the animals had entered the lower end, we cut through the woods hunting for tracks. Finding no sign, we were sure the three moose were somewhere in the shade of the pines lying down.

On the well-beaten trail through the woods, I set up my camera at the side of a pine tree. Jimmy retraced his steps, swung around in a wide circle to follow the trail of the moose where they had entered the woods. He stalked along silently in the hope of starting them on down the trail where I had taken my stand. It might mean a chance shot.

I had waited an hour and was bordering on a tense feeling that hunters say is the symptom of "buck ague." After days of hunting, it seemed likely that these moose were going to walk into my trap. They would get sight of Jimmy and, of course, strike off pell-mell down their accustomed trail, and I could get a good head-on shot. Like a movie director, I was thinking, "Action! Action!" but nothing happened. I was also thinking about a story of a charging bull moose. I had no gun. I could move the camera back out of the trail, but the surrounding bushes would prevent an open shot.

Suddenly I saw a slight movement of something dark through the bushes, and a big bull stood forty yards away. His head was behind a tree and his body partly shielded, so I couldn't get a photograph. How could an animal of this size with his wide-spread antlers move through the thick forest in such ghostly silence? He was as still as a dead stump. Did his nose tell him there was a man in front as well as behind him? He hadn't seen me. My heart was thumping loudly; I was trembling, but dared not move a muscle, so intent was I on getting a chance to turn the crank on this big fellow. Was he never going to stir? At last he walked forward a few steps and came within full view of the camera. He stared at me as the film buzzed through the sprocket wheels. I watched him through the finder, but it wasn't very long. He turned and plunged through the woods toward the river with the speed of a runaway locomotive. He could go. I had him on the film where he could never get away.

The moose had all the advantages when we took to trailing them with a camera through these wide

willow bottoms. The minute one discovered we were after him, it was too easy for him to evade being "shot." As we trailed along day after day, how I recalled the stories of those who seek this fellow with the long-ranged rifle. The gunners like to tell of their difficulties. How I longed to wish a motion-picture camera on them to test their strength and ingenuity. But hunting big game with the motion-picture camera will never be very popular among sportsmen.

PHOTOGRAPH BY FRANCIS DICKIE

A MOOSE OF NORTHERN CANADA

The Alaska Moose is larger and darker than that found in the Yellowstone or than this animal.

A little later we were crouched at the side of a pine tree on a well-traveled moose trail. The thunder ripped and crashed across the valley. It echoed and reechoed against the walls of rock like the booming of cannon. The wind was lashing the willows, when suddenly I saw a yearling moose run out into the open about a hundred yards away. We might get a chance yet if the storm would only drive the herd our way. Hurriedly setting up the camera in the protection of a pine, I started turning the crank on three moose coming down to ford the river. They saw us, milled around and ran back. Then a few moments later, an old bull started our way and waiting till we got half way into the stream about forty yards away, I began grinding. As he turned and plowed back through the water, the crank in my hand turned easier and I knew the last foot of film had buzzed through the camera. Jimmy gave a grunt of disgust.

Taking the camera down, we crouched behind a log among some bushes. We knew by this time the herd was anxious to get out of the storm past us to the wooded mountainside. A big bull, larger than any we had seen, appeared. Without hesitation, he crossed the river followed by seven other moose. In addition to the six we had seen go into the willows during the morning, two others had come in from somewhere. They all waded the river and came straight up the trail which sloped from the water's edge into the pines. The big bull at the head now stood on the very spot where my camera had been a little while before. If he scented danger, he showed no sign of it, nor did any of the others, although several of them had seen us. Perhaps the calmness of the old leader relieved the fear of the others. Some of the herd trailed within thirty feet of where we lay motionless.

The wide-spreading antlers of the old bulls were still in the velvet, soft and not fully developed. They were turned carefully from side to side to avoid rubbing or even touching the limbs. At this age a hard bruise means pain, as well as a deformity in the antler. I can close my eyes and see the old bulls treading gingerly through the trees with the care of market women bearing baskets of eggs on their heads. This was the shot we had been hunting for. It is not on my negative, but it is still vivid in my mind. We lay perfectly quiet until the line of moose was out of sight, when we returned to the horses and camp. Yes, stalking moose is work.

Plans are now well under way under the auspices of the American Nature Association and in cooperation with several other interested groups, for the establishment in the East in 1927 of a Nature Guide School. This institution will be a new departure in its field and devoted to the training in Nature lore of camp counsellors, Boy and Girl Scout leaders, museum workers and Nature guides in the growing fields of community organization, parks and forests. A director of national reputation has already been selected for the school, and negotiations are maturing with relation to the site. It is felt that this work will be the forerunner of other similar schools, so rapidly is the interest in Nature study spreading.

INSECTS *of the* SNOW

By Charles Macnamara

Have you ever seen a snow flea? Here is an entertaining story about an insect that few know. They are not really fleas but get the name from their jumping abilities. The title of this article is drawn against a background of snow on which myriads of those little fellows were sunning themselves on a mild day.

WE ALWAYS think of insects in connection with warm weather. Summer time is insect time, and the hotter it gets, the more flying and crawling things force themselves on our unwilling attention. For while exquisite butterflies and gorgeous moths, or flashing dragon flies, or vivid beetles may delight our eye, it is only too true that most of the familiar insects are pests. In northern climes we hail as a blessed relief the cool weather of autumn that puts an end to their evil doings and annoyances.

Yet neither chilly autumn nor even the cold of winter stops all insect activity. The vast majority disappear, but there are a few queerly constituted insects that can live and thrive amid snow and ice at temperatures low enough to freeze most of their kind to death in a few minutes.

Among these hardy snow-frequenters may be mentioned those curious little worms—not strictly insects—that gain a mysterious livelihood on glaciers in high mountains, and consequently are known as glacier worms. Then there are some tiny insects never seen except in winter, and so little known that they have no popular name. Scientists call them *Boreus,* and they leap on the snow like miniature black grasshoppers. What they eat and how they live has not yet been discovered. The crane flies, better known perhaps as "daddy-long-legs," with their narrow wings and dangling awkward legs are strictly summer insects. But they have a small and poor relation without any wings at all and only moderately long legs, which enjoys itself in the very coldest kind of winter weather, and goes awooing across the snow with the thermometer below zero Fahrenheit. But by far the largest number of snow insects belong to an insect division familiarly known as "springtails." This name being too plain and easy, the savants choose to call them Collembola.

Some nine hundred different kinds of springtails have been recorded. They are found all over the globe from the Arctic to the Antarctic. Nevertheless, owing to their minute size and retiring habits, they are unfamiliar to most people. They are little soft wingless creatures mostly from a twenty-fifth to a twelfth of an inch in length, and they live principally under bark and in moss and loose soil. As they seldom interfere with cultivated crops, entomologists pay little attention to them, and the layman rarely sees them at all. About twenty-five species of them are known to come out on the snow in Europe and America.

Springtails ordinarily walk or run on their six good legs, but sometimes they progress by leaping, and from this practice they get their popular name. Their leaping apparatus is a remarkable structure. It consists of a kind of long forked flap, called the furcula, which is hinged underneath near the tail and is usually kept folded up under the body with the free forked end towards the head. It is held in place by two little fingers that project from a wart on the abdomen. These fingers, when bent outwards, press against the inner edges of the fork and hold the furcula close up against the body. In this position the strong muscles at the base of the furcula where it is attached to the body can put it under considerable strain, so that when the fingers holding it relax, it is pulled strongly downwards and backwards, flinging the insect into the air. Anyone who remembers the homely goose-bone jumping jack that used to delight bygone generations of children will readily understand how the springtail springs. While in the air, the insect folds the furcula in under its body again, so that on alighting it is immediately ready for another leap. Nicely balanced by its heavy abdomen, the spring-

tail nearly always comes down on its feet. The length of the jump may be as much as six or eight inches. In proportion to the size of the insect these are prodigious leaps. It is as if a man could cover a mile in seven or eight bounds. From this leaping habit the species that appear on the snow are called snow fleas, although they are in no way related to the true biting fleas.

Most of the twenty-five or so species that come out on the snow are scarce. They are seen by no one but the patient collector, and his simple soul is gladdened when he finds a few of them. But three or four species are very abundant and at times appear in such swarms that even the most unobservant passerby must notice them. The commonest snow-frequenter in this country is a little stout-bodied dark blue fellow known to science as *Achorutes socialis* Uzel, but taking him as representative of his class, we will call him simply the snow flea.

SNOW FLEAS

Three views—top, side and under—of little *Achorutes socialis*, a stout-bodied, dark-blue mite whom you may see some day if you'll watch the snow.

It is not to be understood that snow fleas live permanently in or on the snow. Their real home is beneath in the soil and forest litter, and when they come to the surface it is only for a few hours, or at most a day or two. What really brings them out is not entirely clear, but the immediate cause of their appearance is mild weather and the consequent moist atmosphere. Snow fleas can stand cold but not dryness. Evaporation is so rapid through the delicate skin of these soft-bodied little insects that dry air is quickly fatal to them. They can live only where the air is moist, and the more moist it is the better they like it. So as the humidity increases with the coming of the milder weather, they emerge in ever greater and greater numbers.

I have seen them on the snow in sheltered places when the air temperature was as low as 18° F., but usually they do not appear until the thermometer has risen to 25° F., and from 32° F. upwards they reach their greatest abundance. Even when the snow lies three feet deep, they are up to the surface within a couple of hours after the mild weather sets in. They do not come up directly through the snow, as there are usually layers of crust too dense for them to penetrate. But around tree trunks, brushwood stems, stalks of grass, and other objects projecting through the snow, there is always a clear space, due partly to the snow settling and partly to heat radiated from the object, and it is from these sally ports that the snow flea hosts issue, sometimes over many miles of country and in such numbers that in places the snow may be black with them.

The movements of individuals appear aimless enough. They clamber over the snow particles, making an occasional leap, but without any obvious objective. The general movement of the throng, however, is always towards light and open spaces. They, too, want their place in the sun and gradually progress towards beaver meadows, clearances and fields and out onto frozen rivers and lakes. As their movements are not very purposeful, when they fall into depressions in the snow like deep footprints they are apt to stay there, and in such places sometimes they accumulate in solid blue masses that could be scooped up in spoonfuls.

If snow fleas are quick to appear when the weather turns mild, they are even quicker to disappear when it turns cold. They make no attempt to return to the ground by the passages from which they emerged, but at the first cooler breath begin to work their way down into the interstices between the particles of loose top snow, wherever they may be. Sooner or later they are almost sure to be stopped by a stratum of compact crust that they cannot enter. They then travel horizontally through the looser snow along the impassable layer until they come to some object penetrating the crust down which they can crawl to the ground. But no doubt a very large number perish in the snow and never again reach the comfortable shelter of dead leaves and rotten logs.

The snow-frequenting habit, although it causes an enormous mortality, cannot in the long run be hurtful to the race. One advantage of these migrations is the cross breeding they bring about by the mixture of colonies. It is possible that what principally drives the insects out on their vast pilgrimages is overcrowding and shortage of food. They are so prolific that a colony living in a limited area may soon outgrow the available food supply.

Beside the Desert Trail

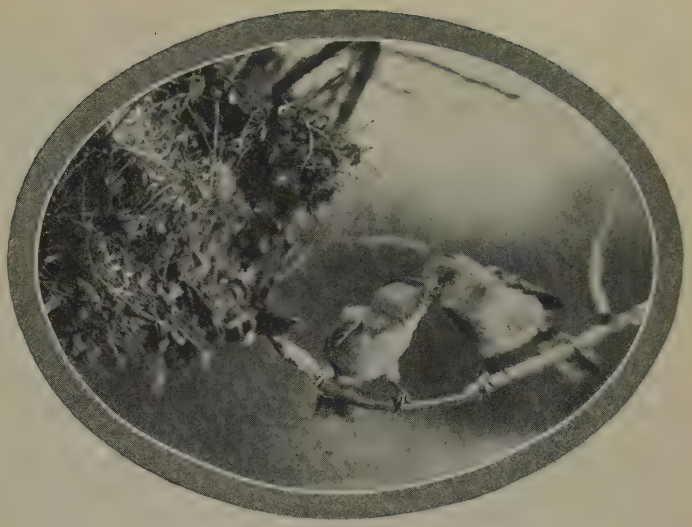
By ARTHUR NEWTON PACK

STOCKHOLDERS go to Arizona to look at copper mines, plain men and women go to breathe the dry tonic air of mountain and desert, tourists go there to glance into the abyss of El Tovar or marvel at the engineering feat of the Roosevelt Dam. A big motor bus whizzes along smooth roads which wind, unwind and fairly lose themselves in an inextricable maze of turns and levels. The big-hatted picturesque driver points to towering pinnacles of rock, red and yellow with minerals and green with lichens, shouts a few words regarding high-pitched cliff dwellings, and the car rolls on to a haven of clean beds and hot food prepared and ready within the walls of the Apache Lodge Hotel. Such the service of civilization gives to those who would return home and say they have seen the world.

Yet the treasures of the desert are not all in copper, lead and asbestos, not all in Apache Indian history or even in the marvels of engineering and irrigation. Some glimpse the fascination of the desert between the lines written by a famous novelist in his hacienda which melts into the landscape of cactus, mesquite and greasewood; some seek it themselves by the roadside. Still they do not disregard the benefits of a civilization which gives them an automobile made from the very metals which underlie the jagged mountains, from the timber which clothes their summits with a Robin Hood's cap of forest green.

To you, perhaps, the desert means an endless stretch of golden sand peopled by Arab sheiks and camels. There are such deserts indeed, but the desert of Arizona is merely as Mary Austin called it, "The Land of Little Rain." To the old rancher it seemed harsh and cruel, a land protecting its meager vegetation in strange shapes, its plant life armed with terrible thorns. The mesquite trees arrange themselves evenly to share to the full the sparse moisture, appearing like ancient apple trees in a deserted orchard. The gaunt awkward sahuaros, or giant cacti, rise in prickly green columns, twenty to perhaps fifty feet tall with grotesque side arms, now in ones or twos, now as an army of green ghosts from nonsense land. These cacti are the tallest of the desert trees, soft and green within, a firm pulp molded upon woody ribs. Where there is no other long straight wood the Mexicans and Indians use the sahuaro ribs for a roof frame supporting the thatch, or for building light fences. The cholla cacti (pronounced *choya*) tempt the hungry cattle with succulent green, behind thorns more terrible than those possessed by any other American plant. Yet a single match will ignite the whole dreadful barricade and leave behind wholesome green juicy fodder.

There is no better place for the amateur to practice bird photography, for the feathered folk are tame, and there



A CHOICE MORSEL FOR DINNER

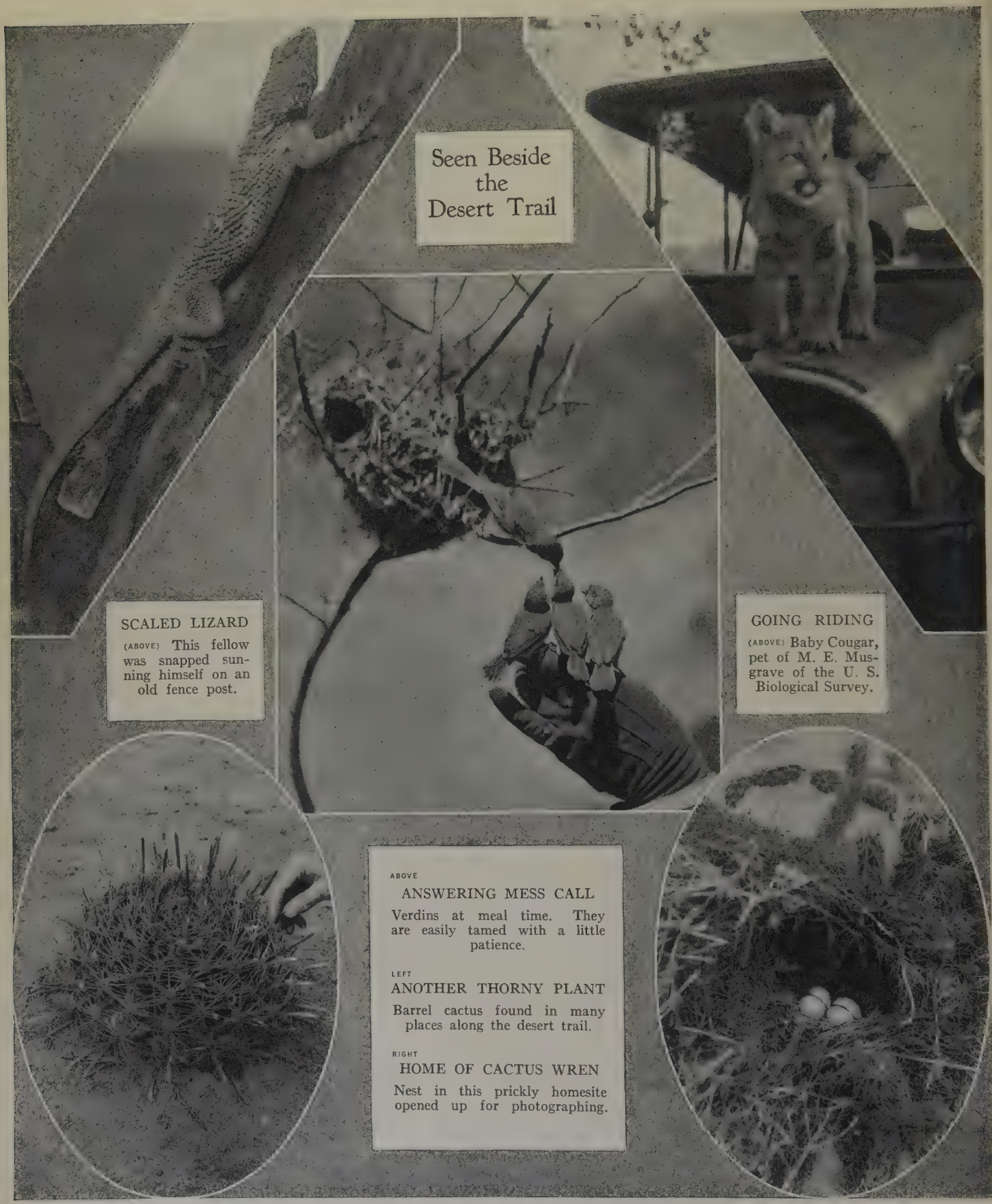
Mother Verdin has brought a tidbit for the youngster at meal time.

PHOTOGRAPH WILLIAM L. AND IRENE FINLEY

A SAFE PLACE FOR A BIRD HOME

The Cactus Wren builds a pocket nest of straws and twigs with the entrance in the side.

Seen Beside the Desert Trail



SCALED LIZARD

(ABOVE) This fellow was snapped sunning himself on an old fence post.

GOING RIDING

(ABOVE) Baby Cougar, pet of M. E. Musgrave of the U. S. Biological Survey.

ABOVE

ANSWERING MESS CALL

Verdins at meal time. They are easily tamed with a little patience.

LEFT

ANOTHER THORNY PLANT

Barrel cactus found in many places along the desert trail.

RIGHT

HOME OF CACTUS WREN

Nest in this prickly homesite opened up for photographing.

PHOTOGRAPH WILLIAM L. AND IRENE FINLEY

YOUNG CACTUS WRENS ON A THORNY PERCH

The full-grown bird is almost too large to be really wren-like and may remind one more of a thrasher or sparrow. These birds make their homes among thorns as prickly as those upon which they perch in this photograph.

are a hundred subjects to every day of travel. Sometimes, perhaps, one cannot photograph but only sit and watch. From the high wall above the Roosevelt Dam a dotted canyon wren pours forth his series of liquid whistling notes, gradually descending and diminishing in volume like falling waters. He is dark brown on the back, light on the throat, fading again into a darker color on the breast. There are rock wrens, too, the male marked by a little white line extending backward from the eye and with a rufous brown patch on the rump. Suddenly, as we stood on the roadway looking up at the high-seamed cliff above the spillway, a cliff cut by diamond drills and dynamite, the air seemed filled with little black birds with sharp-pointed wings, bat-like in flight. Yet by their twittering we knew them to be white-throated swifts. For some moments they whirled and dropped dizzily toward the cliff face, only to swoop upwards again. Then in a steady stream they tobagganed out of the sky with a speed that seemed like sure destruction. For just a moment their wings flickered at the entrance to a crack and the birds were gone. We counted over seventy swifts which were swallowed up in a single narrow fissure.

The road from Roosevelt to Phoenix winds dizzily above the Salt River Canyon, cars and busses labor upward and on, but as we rounded a bend our driver suddenly applied his brakes. Ahead a big truck had broken down and completely barred the way. It would be several hours before traffic could again be opened, and from both directions car after car came to a halt. But what of that? A phainopepla in pure black, with white wing patches, darted out at the roadside, his top-knot like the headdress of an Indian chief. A cactus wren flew out of a cholla where it looked as if it had its nest. We could hardly believe him a wren, he seemed so much larger than the wrens we knew. Here at the roadside, built in the thorny crotch of a swaying palo verde limb, was the most exquisite piece of bird architecture we had ever seen—the nest of a verdin, a member of the titmouse family. We hunted the little round doorway that opens up into this tiny little desert home hung in the thorn tree. To the other tourists, perhaps, it looked like a bunch of dry leaves and thorns that had been whirled up by the wind and caught by chance in a bristly crotch. Yet no brick or stone structure had ever been planned with more careful purpose. Little thorny twigs had been worked and locked together. The fibers and dried leaves of desert plants had been fitted in between, and the little pocket nest of these desert weavers had been made safe from lizards and snakes. The doorway opened in from below, a sort of a little covered porch with the hall running up and into the main living room, soft and feather-lined, and hidden from the all-seeing watchfulness of some spying hawk.

PHOTOGRAPH M. E. MUSGRAVE

BONNIE AND HER BEAR

Many are the wild pets one can find beside the desert trail.

PHOTOGRAPH M. E. MUSGRAVE

A "SHOT" AT A COUGAR

Here the animal is caught in true wild surroundings in the trees.

It was late February, but on the mountainside bloomed several strange and beautiful wild flowers—one a yellow lupine, the common Golden Pea or Buck Bean of the west, another the pretty blue Covena or Brodiaea, also uncomplimentarily known as Hog Onion. The greatest find of all was a Japanesey plant suggesting Mimosa. The calyx and corolla of the blossoms were so small that the flowers appeared to be merely a group of many stamens about an inch long, white at the base and shading to bright pink. Someone thus called it the bird of paradise flower, but its more common name of Fairy Dusters seemed most fitting. Far below

was a sandy wash where sycamores and oaks grew in abundance. Here one might find screech owls or even a horned owl at home, perhaps a road-runner and other bird and animal life.

Perhaps the truck drivers cursed beside the road, although again they seemed good natured. Time bears less heavily in Arizona canyons than in those other man-made canyons of sweat and steel. We almost felt sorry when, with the late afternoon, the way was clear and we set out again. Sunset caught us thundering up from the awesome depths of Fish Creek Canyon, caught the precipitous walls in a reddish glow, caught the distant peaks, shadowed the canyons in bottomless purple and blue and gradually vanished into clear yellow twilight. At last lights twinkled far ahead and glowed through clustered tent walls. Ours was to be a night under the stars at Mormon Flats, where the distant roar of concrete mixers pouring cement into the new dam mingled strangely with the yip of a stray coyote. He should have been down on the plains below, not up here, but perhaps the insistent hunters had driven him out. We had been told that only bobcats and cougars inhabited the rugged ledges and cliffs.

PHOTOGRAPH WILLIAM L. AND IRENE FINLEY

A MOTHER PLUMBEOUS GNATCATCHER

She has selected as a place for her home the cholla cactus with the spearlike needles, and there wove a cozy and safe home.

A shape moved in the darkness outside the largest tent; it gave vent to a "Woof!" just as the opening door revealed a bear cub kept by the proprietor. Mexicans are everywhere in this region and they are great collectors of wild pets, frequently offering for sale anything and everything from ring-tailed cats and armadillos to young wildcats and cougars. There was quite a wild animal colony at Mormon Flat. "Flossie," the brown bear cub, chiefly led an indolent life, but she developed a remarkable fondness for oranges, and her long toenails made good fruit knives. Her disposition might have been sweeter if her human neighbors had been more patient and less willing to reward her playfulness with a cuff. As it was, the two raccoons, for all their black highwaymen's masks, proved the more friendly. They held us up only for a bit of biscuit. The cougar was plainly hostile. She lived in a cage and drew back her ears and hissed at us. That was again, perhaps, chiefly a question of treatment, for Mr. Musgrave of the U. S. Biological Survey, who lived in Phoenix, owned a baby cougar which followed him about everywhere and even rode on the engine hood of his car.

A strange weird glow hovered over the walls of some canyon, half hidden behind the intervening hill. As we stumbled along toward it in the darkness it grew brighter and brighter, bringing out each cliff and ponderous rock in ghostly bas-relief, until there burst before us a myriad of dazzling electric lights under which pigmy humans labored on the final stages of constructing the new Mormon Flat Dam. Civilization at midnight in the wilderness—a civilization striving endlessly to control the forces of Nature for human needs! The great curved expanse of white concrete already stretched from canyon wall to wall; it already held in leash a hundred feet of precious water, reflecting impartially the brilliant points of man-made light and the infinite stars. By day, indeed, Man is king of all the earth. Only at such a time as this, only amid the awful grandeur and silence of a wilderness night, is it given to him to see and know his limitations, to stand upon a rocky pinnacle apart and compare his vaunted self-sufficiency with the whole mighty plan of Nature. Yes, it is humbling, indeed.

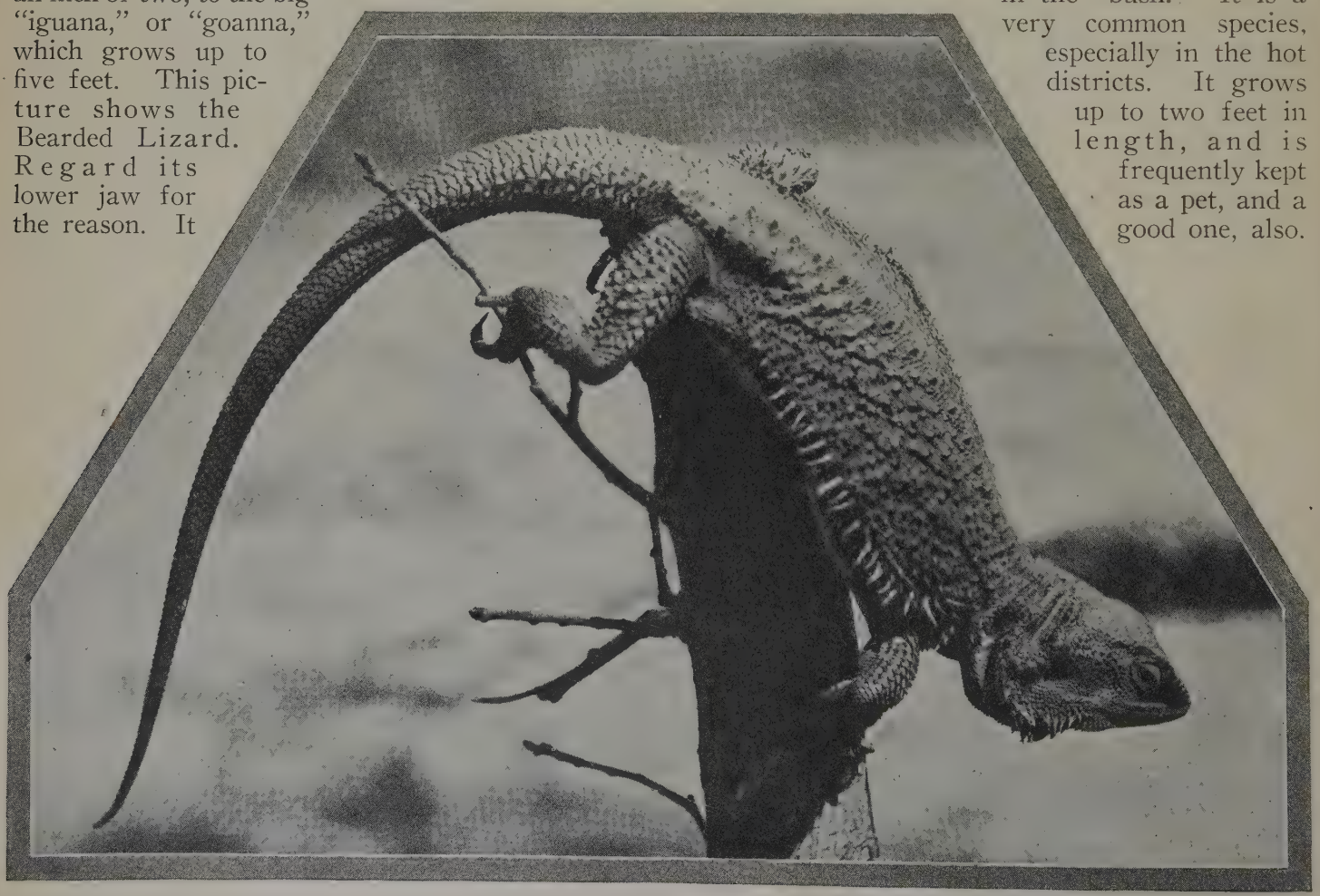
That water which gushed and spurted at the bidding of human engineers from great pipes beneath the concrete wall went hurrying, rushing and whirling down through the canyon, but it would never again become the roaring flood of spring or the dry summer trickle. Next day we saw it flowing placidly in great irrigation canals to transform the valleys about Phoenix from the desert they had formerly been to fertile fields lined with cottonwoods in the glory of spring dress. Only here and there a last giant sahuaro stood sentinel beside a cotton gin, a prosperous dairy or a grain elevator. And how the birds had taken to the gardens and orchards; orioles' swinging basket nests hung in the bordering trees; flocks of blackbirds flitted across the fields.

This was indeed the end of the desert trail. Does it also mark the gradual but eventual conquering of the desert itself? Will our children read the old stories of Arizona's beginnings in wonder and unbelief? The Governor of Arizona is a lover of Nature. His handsome grounds are a beautiful garden where tall Italian cypress trees line the drive and cluster against tall white walls. From one of those classical evergreen columns hung a telltale little ribbon of twig, and presently a cactus wren darted forth from the dense protecting branches where he had been building his nest. The dreadful cholla has disappeared from that valley, but its favorite tenant has not gone with it. No; like countless birds before him, he has taken to the homes of man, and builds his strange soft-lined tunnel in the garden. Perhaps, when we talk of conquering Nature, she only smiles at us, a part of her plan.

Australian Bearded Lizard

By Kilroy Harris

AUSTRALIA is the home of about four hundred species of lizards, including some of the strangest in the world. They range in size from an inch or two, to the big "iguana," or "goanna," which grows up to five feet. This picture shows the Bearded Lizard. Regard its lower jaw for the reason. It has a rather terrifying appearance, but it is perfectly harmless, even though sometimes it crawls into your blankets at night time when you are camping out in the "bush." It is a very common species, especially in the hot districts. It grows up to two feet in length, and is frequently kept as a pet, and a good one, also.



AN ATTRACTIVE SUBSTITUTE

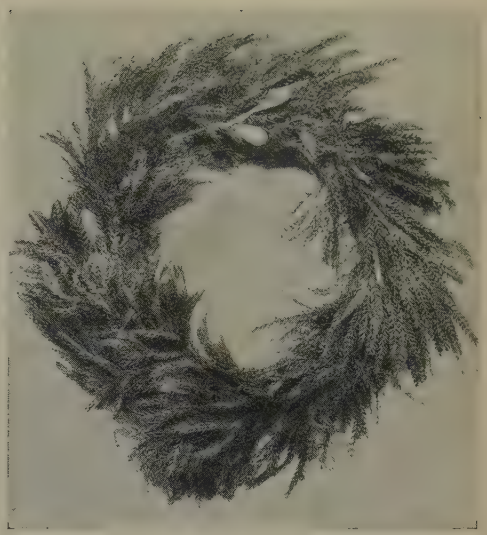
A fiber wreath of red decorated with the green of preserved ground pine.

If the population and the demand for Christmas greens increase as rapidly in the next fifty years as they have in the past, it is certain that unless many of the greens are soon extensively cultivated, another generation will not be able to obtain them in the natural state at all.

Our Christmas Greens—A Real Problem

By P. L. RICKER

President, National Wild Flower Preservation Society



PRESERVED GROUND PINE

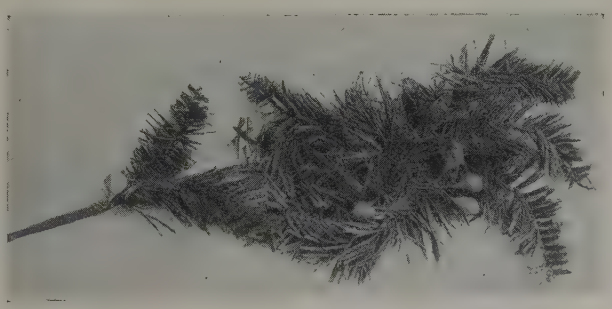
This wreath can be used year after year, saving the annual drain on the supply.

ABOVE, in a single sentence, is stated a fact of no small significance. With a prodigality typical of the use of many of our natural resources we have brought ourselves face to face with a problem. The Christmas season is one that we should want to observe and to go on observing forever. But we have used many growing things for this observance with such a lavish hand in the past that we must now think of the future. We must apply strict conservation in various directions, self denial and the use of substitutes in others.

The materials used for Christmas greens vary considerably in different parts of the country. The natural abundance of any plant material used in a given section varies so much throughout its range that statements regarding its use in one section may not apply to it at all in another section. Campaigns for the preservation of Christmas greens must be conducted with these points well understood, otherwise the campaign may be a failure. In a general way the materials found growing naturally and used for Christmas greens in the Eastern and Western halves of the United States and Canada are quite different, and except possibly to a limited extent along the meeting line, are not mixed on the market.

Christmas trees are made up of pines, some cedar and hemlock and the better grades of various species of spruce and fir. The latter are largely cooler region species and have been imported to a large extent by the southern cities from the north. Yearly quantities of these always remain unsold and are burned after the festivities. During the past two years shipments of trees from the northern states and Canada have been considerably restricted by quarantines against the blister-rust and gypsy moth.

Much has been written and spoken against the use of Christmas trees on the ground of forest depletion. This is, however, largely unwarranted. Some of the pines reseed themselves abundantly and are of little value for any other purpose except fire wood. Many farmers could realize a good profit by planting unoccupied land to nursery rows three feet apart each way with volunteer seedlings, or collect and sow the seed for this purpose. While the market for such material is limited, alternate rows and alternate trees in the remaining rows may be cut for Christmas as soon as the trees reach sufficient size and the remaining trees, now six feet apart each way, may be grown to maturity for stove, lumber or pulp purposes. The State and National Forestry Departments will advise as to the best trees adapted to each section and some State Forestry Departments will furnish seedling trees at a low figure. Few people seem to be aware that several states have laws exempting reforested land from taxation for a period of twenty or more years or plan such.



THIS IS MADE OF GOOSE QUILLS

This is an imported decoration made of quills and red berries and is attractive as a substitute.

In some sections of New York owners are reported to have sprayed their trees in November with a mixture of lime and glue to make them unsalable if stolen. This is to check the reprehensible practice of stealing trees either individually or in numbers. The mixture is washed off by spring rains without injury to the trees.

The Native Holly is largely a coastal plant and ranges from Massachusetts to Florida and eastern Texas. While many eastern places get their supply locally, those not so fortunately provided are receiving large shipments from Delaware and the eastern shore of Maryland. An excellent report for this section prepared for the Garden Club of America states that last year the Pennsylvania Railroad shipped 13,979 cases of holly branches and wreaths. A case contains two hundred wreaths. At least as many more cases were probably shipped by boat.

Eastern Virginia, North and South Carolina, Georgia and Texas probably ship as large quantities by rail and boat. The western half of the United States has no native evergreen holly, but considerable quantities of the European holly are now cultivated in Washington and Oregon and shipped to adjoining states. This and the native holly may be grown readily from cuttings, but the seed has to remain in the ground two winters to germinate. Plants of both kinds are now listed by many nurserymen in from one and a half to five-foot sizes at from seventy-five cents to ten dollars each. In some cases this includes guaranteed pistillate or staminate trees and those in which trees of one sex are budded or grafted on trees of the other sex. Only female trees bear berries, and without the proximity of a male tree, or budded or grafted male branches, no berries are produced.

BEAUTIFUL EFFECTS CAN BE GOTTEN WITH THOUGHT

Here two red candles flanking a vase of pine or artificial preserved leaves make a striking display for buffet or window.

The Winterberry, one of the deciduous leaved hollies, is found in most of the swampy parts of the east. It is much sought after for its brilliant red berries, to use in wreaths of ground pine and the evergreen holly which comes from male trees. It is rapidly disappearing and a more attractively formed substitute than the usual "gob" of red wax must be found to meet popular approval.

The Mountain Laurel is the plant most extensively used for wreaths and chains and all decorative purposes in the eastern states throughout the year. As yet the preserved leaves have not appeared on the market. It ranges from Maine, where it is extremely rare, in increasing quantities through the Central American States to the higher parts of Eastern Texas, towards which it decreases in abundance. In many sections where it is very abundant, farmers regard it as a pest. In such sections there can be little harm in its commercial use. Bushes cut back nearly to the ground will often put out several three-foot shoots within a year.

Areas for commercial cutting should be divided so that no part should be cut oftener than once in three to five years, and a charge of at least two dollars and fifty cents per acre or ten dollars per ton of material should be charged by the owner for the cutting privilege. At present much of the market supply is stolen. Several New York dealers use from forty to three hundred tons per year. An estimate of ten thousand tons has been made by the secretary of the Connecticut State Forestry Association as the annual market demand for the country and forty thousand acres necessary for its growth. Two hundred thousand acres would supply the country on a five-year cutting rotation. The states where it is abundant could

THESE LITTLE GREENS GO TO MARKET

A typical annual scene in the market where Christmas decorations are lavishly on sale.

meet all demands under the above plan with no danger of its extermination.

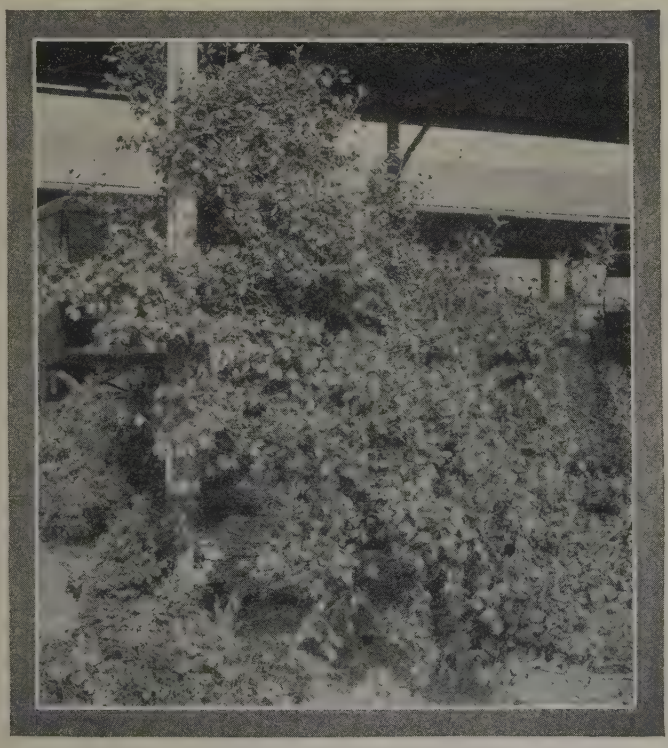
California Holly, also called Toyon or Christmas Berry, is not a true holly but belongs to the Rose family. It is becoming very rare around all thickly settled sections but in unsettled areas it is still abundant and in some places is protected by being mixed with other plants in impenetrable thickets. It is cultivated largely as an ornamental and is one of the principal sources of decorative materials at all seasons, much as is our eastern Mountain Laurel. In the wild state it is mostly confined to the lower parts of the coast ranges of California. The California law requires a certificate of ownership, or of permission of the owner to cut all that is offered for sale and it is claimed that this has reduced its sales materially.

The Oregon Grape as it was first called by the early settlers, because of its waxy-blue clustered fruits, has recently been called Oregon Hollygrape. While it is neither holly nor grape, the leaves do quite closely resemble the holly leaves in shape, but botanically it is a barberry. It is mostly found in woods near the coast from San Francisco north through Oregon and Washington, and is considerably used for Christmas wreaths. It is, however, being destroyed too rapidly to last many years except in the more inaccessible places.

The Ground Pine, of which three species are commonly used, has always been the principal material for wreaths in the east and is disappearing very rapidly. It might be grown from root cuttings, but this is probably not commercially practical. Unless a halt is called in its use, it is destined soon to become rare everywhere. In the west the few species are not abundant anywhere and have been little used. During the last few years the wreaths have been treated with preservatives by some dealers and artificial red berries added. The wreaths may then be put away and used over again for many years. This method of preserving should be applied to many other greens and will as soon as there is a public demand for it.

ONE OF THE UNATTRACTIVE KIND

This artificial wreath, cheap and inappropriate, does not help in bringing about the use of substitutes.



THE END OF ONE HOLLY TREE

Whole tree maliciously and wastefully cut down for the Christmas greens market.

The mistletoe is a parasite of oak, gum, tupelo, red maple and other trees and is found more or less commonly in many parts of the country. Many collectors are in the habit of shooting it down with a small rifle. As it injures the trees its collecting cannot be objected to.

In the southern states Smilax and Galax, extensively used for Christmas decorations, are shipped to all parts of the country in considerable quantity for decorative use at all seasons. In some sections the Galax is being used up rapidly.

In California the coastal Redwood is not only used for Christmas trees. but is the principal source of wreaths. For this purpose it is understood to be quite abundant and at present in little danger of extermination although the natural beauty of the country side is being much destroyed by indiscriminate and surreptitious cutting.

The Holly-leaved Cherry, Salal and Coast Huckleberry are also used in California to a considerable extent for wreaths, and are said by local botanists to be impossible to exterminate.

In the artificial preservation of foliage for decorative purposes the process is largely controlled by a very few dealers. The

preserved are as attractive as the fresh leaves and do not become brittle, or drop to pieces. They are first bleached with about a 50 to 75 per cent solution of Javalle Water for about twelve hours, or until the green color is all removed, dyed with a dye of appropriate color suitable for dyeing cotton goods, and then rendered permanently pliable by soaking for a short time in about a 10–15 per cent glycerine solution. They may then be fireproofed if desired with ammonium phosphate. The process is at present much more generally applied to such deciduous leaves as oaks and maples for general decorative purposes at other times than Christmas.

Cultivated natural and prepared as well as artificial substitutes for Christmas greens are now becoming more abundant on the market each year. The better grades are still rather expensive, but will increase in quantity and decrease in price as the demand increases. The living plants may be obtained at many florists' shops or at the larger nurseries. The better grades of artificial material are carried by the florists and many stores, while cheaper grades are found at many of the five-and-ten-cent chain stores. One of the chain stores reported few sales of artificial material last year and has ordered none this year. Much of this material observed consisting of poor imitations of maple and other leaves in wreaths and paper chains were not attractive to the Christmas shopper, some were not even suggestive of the season. Pine cones, Lotus pods and others of the larger seed containers are extensively painted in metallic colors and dried plants of our common weeds like pepper grass are given a coating of green paint and the tips of the branches rolled, while still sticky, in coarse starch grains that have been dyed red or blue, giving the effect of flowers. These are probably obtained by grinding up wheat or some such grains.

Among the growing cultivated plants, suitable for Christmas decorations, may be mentioned small tubbed Evergreen Trees and Boxwood; potted Coontie, Holly, Ardisia, Jerusalem Cherry, Peppers, Dwarf Orange, Poinsettia, Scarlet Plume, Araucaria, Cyclamen, Primulas, Heather, Asparagus and the smaller Ferns.

In the natural preserved material Ground Pine is furnished in red and green colors; Strawflowers or Everlasting in red, salmon, pink, yellow, brown, lavender and purple; Statice cultivated and imported from Germany is dyed in ten colors; Gypsophila, dried and used to attach to wreaths; Rusus in red, green, purple, and seven metallic colors; Cycas in five colors and bronzed Galax.

In the artificial material excellent small Holly trees and sprays with berries and sprays of leaves in gold and silver colors with red berries are offered and small Poinsettias in natural and metallic colors. Artificial small and large Holly berries, cherries and acorns may be obtained from dealers at small cost.

Many excellent combinations of the above materials are very effectively made, not only in wreaths, but in set pieces and surrounding red or green candles. These are used on buffets and tables in various situations. One of the most effective settings has been to place on tables in windows, two red candles with bowl, or low vase of pine branches, preserved or artificial leafy branches, the candles often being lighted at night.

Red fiber wreaths which seem to be largely imported from Germany and Japan form one of the most attractive substitutes when tied with a spray of preserved ground pine and Statice, Gypsophila or a small plain or suitable colored pine cone. The smaller sized wreaths are extensively used for decorating the rear window of sedans and coupes.

The pages of the florists' trade pournals in November and early December are full of advertisements of all such materials, and those interested in the use of substitutes and preserved material should urge local dealers who have not already done so to order a trial stock. Organizations putting on conservation campaigns can obtain samples of such materials in advance of the season and hold exhibition, or give lectures, particularly in schools, using colored lantern slides showing substitutes and the destruction of living material, which can be obtained at National Headquarters.

To encourage the growing of Holly the National Wild Flower Preservation Society has arranged with nurserymen to have a small holly plant grown from cuttings or transplanted from woods being cleared, shipped free to all members who use or dispose of one hundred Christmas seals at one cent each. Larger sized plants will be sent contributing and subscribing members. Members will, however, be expected to pay transportation charges collect. Small plants will go by parcel post, the larger by express and the shipping weight of medium sized plants will be about twenty-five pounds. In the spring offerings of Dogwood, Redbud, Mountain Laurel and possibly other plants needing protection will be made. Those not able to use the plants will be given the quarterly periodical instead.

Two Popular Planets, Venus and Mars

By ISABEL M. LEWIS

IF A VOTE should be taken as to which is the most popular planet of the solar system—next to our own earth, of course, which is to us all-important—Mars and Venus would probably run a close race for first place.

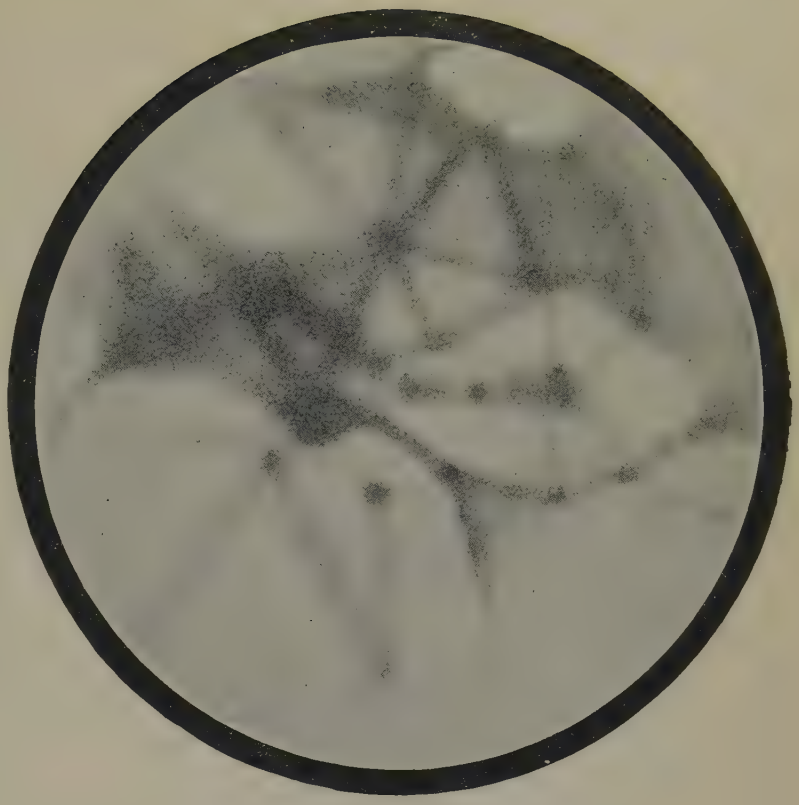
Our special interest in these two planets is probably due very largely to the fact that they are the only two planets, outside of our own, that may possibly be inhabited though not, to be sure, by humans like ourselves. That would be impossible because of the great difference in surface conditions on the different planets.

Yet when we think of the countless forms of life that exist on our own planet and the different conditions under which they live, in depths of the sea under pressure of several tons per square inch where the sun's rays never penetrate, in the rarified air of lofty mountain heights, under the burning rays of a tropical sun, in the frigid cold of long polar nights, we should hesitate to deny the possibility of life in other worlds, simply because conditions must be very different there from what they are at the earth's surface.

Of the surface of Venus we know very little because it is surrounded by an opaque atmospheric screen that our eyes cannot penetrate to any extent. But the fact that it has a dense atmosphere, and also that heat radiations from its night side have been detected, would imply that it has an abundance of air. The impossibility of observing any markings on the surface of Venus makes it difficult to find the length of the planet's day, which is usually determined by noting how long it takes for some permanent marking to be carried around by the planet's rotation on its axis. For the same reason it is impossible to tell how much the planet's axis is tipped from the perpendicular which determines the nature of its seasons, or whether it has any at all.

In the case of Mars the surface markings of the planet are seen to fine advantage because of the great transparency of its atmosphere. As a result we have found that the Martian day is only half an hour longer than our own day and the Martian seasons very similar to our own seasons, since its axis of rotation is tipped at very nearly the same angle to its orbit. So Mars, like the earth, has its frigid, temperate and torrid zones and its spring, summer, autumn and winter. Only as the Martian year is nearly twice as long as our year the Martian seasons are nearly twice as long as our seasons.

One of the strongest proofs that we have of the existence of vegetational life on Mars are the seasonal changes that are easily observable on the planet's surface and that make it such a fascinating planet to observe in a powerful telescope. Mars, it is known, has no great oceans, seas or lakes, such as cover three-fourths of the surface of our own planet, and is dependent largely upon the melting of the polar snow cap in summer for its water supply. These polar caps of very considerable size but shallow depth melt alternately and unlock the water supply needed to promote the growth of vegetation. As the polar cap melts and spring advances the greenish color that spreads over portions of the Martian



A DRAWING OF THE PLANET MARS

This was reproduced by R. J. Trumpler from the appearance of the planet in the 36-inch reflector of the Lick Observatory on August 29, 1924, when Mars was approximately 35,000,000 miles from the earth.

This drawing shows the south polar cap of Mars (at the top of the drawing since the telescope inverts the image) which is tipped toward the sun as it is the summer season in the southern hemisphere of Mars. The bright-colored areas are reddish in color and are believed to be arid sandy deserts. The dark areas—chiefly in equatorial regions and the southern hemisphere—were originally called seas, but it is now known that there are no large oceans or seas on Mars, and the dark regions are believed to be due to vegetational growth.

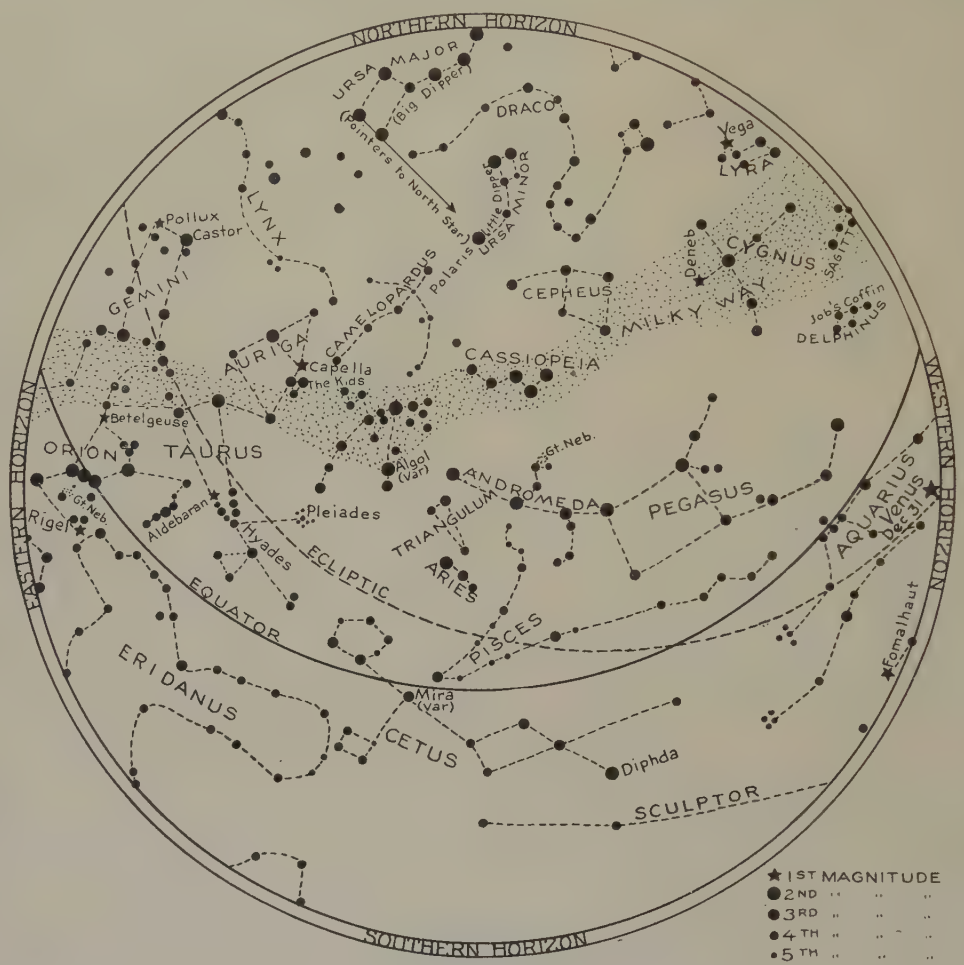
A portion of the much-discussed "canal system" of Mars is clearly pictured. The nature of the "canals" of Mars is still a mystery and an open question. The coarser "canals" are several hundred miles wide and the smallest are twenty miles or less in width. They form a network covering nearly the entire surface of the planet.

landscape is clearly visible in the telescope, and gives a beautiful tinge of color to the planet that was noted by many observers at the last opposition. It seems sheer folly to undertake to explain this spread of greenish color over the planet at the advance of spring as due to anything except vegetation.

Until quite recently it was very generally believed by astronomers that the temperature of Mars never rose as high as the freezing point of water. Therefore life on Mars was felt to be impossible, in spite of the fact that the melting of the polar snow cap at the advance of spring seemed to furnish sufficient proof that the temperature rose high enough to permit the melting of snow and ice in spring and summer in polar regions.

That the temperature of Mars rises daily at noonday on the equator to a temperature of 60° to 65° F. was definitely proved at the last opposition of the planet in 1924 by Dr. W. W. Coblentz, of the Bureau of Standards, Washington, D. C. With the aid of astronomers at the Lowell Observatory, Flagstaff, Arizona, he made measurements of the temperature of different parts of the surface of Mars by means of a sensitive little instrument known as the vacuum thermocouple which measures the heat radiations from the surface of the planet. This little instrument attached to the powerful 40-inch reflector of the Lowell Observatory has revealed many interesting facts about the climatology of Mars. It may be predicted that with its aid many facts will be learned about the temperature changes that take place on Mars at future oppositions.

It was also discovered with the aid of this instrument that the temperature of the morning side of Mars at the equator is low, usually about 50° below zero Fahrenheit, but that the evening side is considerably higher generally around the freezing point. This would be expected as a result of the accumulation of heat by the surface during the day. During the coldest part fo the Martian night the temperature would register close to 100° below zero, it was estimated. Evidently, then, the Martian inhabitants would have to be so constituted that they could resist great extremes of temperature. This is quite conceivable for there are many forms of life on our own planet that survive periods of intense and prolonged cold by remaining torpid or hibernating.



Hold over the head with top toward North.

Among other interesting results obtained at the last close approach of Mars to the earth are the drawings and photograph obtained at the Lowell and Lick Observatories, and by Prof. W. W. Pickering at Mandeville, Jamaica, and a number of other observers in our own country and abroad. Unusual and valuable photographs were obtained at the Lick Observatory with the aid of specially dyed plates which made it possible to study the planet's surface in both infra-red and ultra-violet light. The remarkable results obtained and the cause of them is evident from the photograph shown here, taken at the Lick Observatory.

The photograph of the planet taken in infra-red light shows strongly contrasting surface markings on the planet because the infra-red rays can easily penetrate through the planet's atmosphere owing to their wave length. The passage of the short wave length ultra-violet rays, however, is obstructed by the planet's atmosphere so that the photograph of Mars taken in ultra-violet light shows only the atmosphere of the planet and the extensive area of cloud and mist over the smaller surface polar cap

of snow and ice. Though the atmosphere of Mars is thus found to be much more extensive than was formerly suspected, it is known, in other ways, that it must be very rare, probably much more so than the air on our loftiest mountain peaks. This extreme rareness of the atmosphere of Mars as well as the great daily range of temperature in equatorial regions are factors to be borne in mind when we feel inclined to speculate as to the nature of the beings that we may reasonably assume exist on the surface of this interesting little world.

Now let us turn to the December evening skies. The constellations of winter which are the most brilliant and beautiful of all the seasons of the year are now coming well into view in the east. There we will find Taurus, The Bull, with its well-known groups of the Pleiades and Hyades and the ruddy Aldebaran, that represents the Eye of the Bull, and there is the magnificent Orion with its many stars of first and second magnitude. To the north of Orion is the brilliant Capella, The Goat, with her small kids or Hoedi close by forming a small triangular group that makes it easy for us to identify this brilliant star. Castor and Pollux the Twins, in Gemini, are also well in view now in the northeast. Five stars of the first magnitude, in all, may be seen in the eastern sky, in addition to many of the second.

In the north Cassiopeia is now passing to the west of the meridian and the Big Dipper is swinging over to the east of the meridian though it is still close to the northern horizon to be seen to advantage. The Great Square in Pegasus covers a large space in the western sky and will be found about halfway between the horizon and the zenith. The most easterly of the three stars in Andromeda is now nearly overhead and this line of bright stars runs in a southwesterly direction to join Pegasus, the most westerly of the stars in Andromeda forming the northeast corner of the Great Square.

Fomalhaut, the only star of first magnitude now in the southwestern sky, is close to the southwestern horizon. Cetus, The Whale, whose huge form now lies across the meridian in the south, contains but one bright star, Diphda, a second magnitude star standing in solitary position in the southwest. Pisces, The Fishes, to the north of Cetus is another constellation that consists almost entirely of faint stars. Aquarius, The Water-Bearer, now approaching the southwestern horizon, is also a large but inconspicuous constellation. Were it not for the planets Venus and Jupiter, which will be visible in the earlier part of the evening throughout the month, there would be little of interest in the southern sky this month.

Venus is now a magnificent object in the southwest for about three hours after sunset. It reached its greatest distance east of the sun on the 27th of last month and its angular distance from the sun is now decreasing but its brightness will increase steadily during the month as it draws in toward the earth and inferior conjunction with the sun which is to take place early in February. So during this month we will see Venus at its best, its greatest brilliancy being attained on January 2, after which it will rapidly decrease in brightness and in a few weeks disappear in the rays of the setting sun.

Jupiter is still in the southwestern sky in the early evening and at the first of the month will be found only a few degrees northwest of Venus. By the end of the month it will be far over in the southwest at sunset. Saturn and Mars are now in the eastern morning sky but are still too close to the sun to be seen to advantage. These two planets will be in conjunction on the fifteenth of the month.

Mercury passes from east to west of the sun on the 11th of December and after that will be in the morning sky and may possibly be seen in the southwest before sunrise the last few days of the month, when at its greatest distance west of the sun.

Winter will begin on December 22 at 3.37 a. m., Eastern Standard Time, when the sun reaches its greatest distance far to the south of the equator.

Mole Cricket and Youngster

THE PHOTOGRAPH shows a South American Mole Cricket with its young. It is well named when one observes its powerful digging forefeet, resembling those of a mole. It is a common sight to see spiders carrying their young, but very rare to find an insect doing so as shown here. Perhaps it was an accident, but nevertheless the photograph was a lucky one, showing the cricket life size. We have a mole cricket much like this one in the United States.

St. Francis d'Assisi—Patron of the Birds

By KATHERINE G. BRYANT

IN A SMALL red-brick chapel in the grounds of Mount Saint Sepulchre, the Franciscan Monastery at Washington, D. C., is an almost life-sized statue of the founder of the Order, St. Francis d'Assisi. The statue reveals St. Francis sitting on the stump of a tree in a somewhat contemplative attitude, gazing heavenward. A falcon perches on a branch beside him. The statue is religious in character, but the tree and the bird are typical of one of the chief and most delightful characteristics of this great exponent of joyousness in religion.

By every lover of Nature the name of St. Francis d'Assisi must always be revered. He drew from the great out-of-doors many of the themes for his wonderful discourses. He bespoke for the trees and flowers, the beasts and the birds, that love and protection which is the hope and aim of the modern conservationist. In times of strife, discouragement and hunger, St. Francis drew from his love of Nature an inspiration and a sustaining force for both his companions and himself during a life that was almost a martyrdom.

The chronicles of his communing with Nature are many. The stories of his speaking to the trees, the winds, the flowers, and his conversion of the bad wolf have come down to us. It was in his love for the birds, however, that St. Francis makes his greatest appeal to the lover of Nature.

"Dear Birds, my sisters, praise God, your Creator, for the many blessings He has bestowed upon you. Ye sow not; neither do you reap—so God feeds you and gives you the streams and fountains for your thrist; He clothes you and your children, since you neither spin nor weave; He gives you the trees wherein to make your nests; He gives you freedom to fly everywhere and has deputed the element of air to you. Beware that you are never guilty of the sin of ingratitude and ever strive to praise God."—From St. Francis' Sermon to the Birds.

Arriving one day at a castle where he intended to speak to the inhabitants, the great flocks of swallows nesting in the battlements and crannies of the building kept up such an incessant chattering that it was impossible for him to be heard. St. Francis, undisturbed by the noise, turned to his feathered friends and, addressing them instead of the gathered household, spoke to them indulgently asking that he might have silence in order to deliver the great message with which he was charged. The compliance was instant, we are told, and the impression of their obedience added increased weight to the sermon which followed.

Again, meeting a boy on the way to market with a number of turtle-doves in his arms which he intended to sell, St. Francis was filled with grief at the thought of the fate which awaited them at the hands of their purchasers. His pleadings that the boy surrender the birds to him were at first met with an obstinate refusal. The youth argued that the money they would bring was needed to secure the necessary comforts of life. The kindly face and gentle words of the strange man, to whom worldly goods were as nothing, soon won the boy's heart. He surrendered the birds to the now jubilant St. Francis, who gathered them into his arms crying, "Oh! my friends, why have you permitted yourselves to be taken?" He took them to his home and built them nests where they lived until such time as he bade them depart in peace. The doves were not the only fruits of this incident, however, as the boy became one of his devoted followers.

Imbued with the message that he felt inspired to carry to the world, St. Francis and his companion, Brother Maximus, traveling from place to place, found themselves one day near the town of Bevagne. The dust and heat of the summer day had sorely tried good Brother Maximus, for it had been a long and tiresome journey. Through it all, St. Francis had

talked of the glorious sunlight, the fragrant air, the beautiful scenery and the wonders of God as manifest in Nature. A great chattering was presently heard and they beheld the branches of a small grove of trees laden with a great flock of birds. "Await me here in the road," St. Francis said to the only too willing Brother Maximus, "and I will go preach to my sisters the birds."

Approaching the trees, St. Francis began speaking to the birds upon the ground. Soon those birds in the trees fluttered down to the ground where all remained quiet until he finished speaking. So comes down to us St. Francis's famous sermon to the birds.

"Having finished his blessing," says Maximus, "the birds began to open their beaks and stretch forth their necks and spread their wings and reverently to bow their heads even to the earth and by their acts and their songs to set forth that the Holy Father gave them the utmost delight."

Finally, his preaching ended, St. Francis made the sign of the cross to the birds and bade them depart. The birds rose into the air singing, and in the shape of the cross which had been made to them. Then they departed in four directions, groups flying to the north, to the south, to the east and to the west.

"It was thus," Brother Maximus tells us in his account of the incident, "that the preaching of the cross of Christ renewed by St. Francis, was by him and his brethren born throughout the whole world; which brethren, even as the birds, possess nothing of this world's goods but committed their life to the sole and only providence of God."

Little Jack

By Walter P. Taylor

OUR pack-train in the Pine Forest Mountains of northern Nevada was made up of two burros. That is to say, the two burros constituted the portion of the train that we could pack, the third member, little Jack, being a relatively useless colt burro which, like many young children, ran to long legs, long ears, and a comical awkwardness. Also like some children, little Jack was shy with strangers; and although we had been asociated with his mother and himself for several days, we could hardly get near him.

PHOTOS BY THE FINLEYS

LITTLE JACK POSES

Above he sits for an excellent profile, while to the right he is caught with the most expressive part of his make-up (save for his bray, which does not show) erect in the air. Little Jack was always an interesting companion to have around the camp.

One morning we were awakened by the bray of Jack's mother. We were wide-awake at once, for the burro's bray, at least to one who is unfamiliar with it, is, as someone has said, one of the most terrifying sounds in nature. We were not long in finding the cause of the mother's anxiety. Little Jack had disappeared! We dressed in a hurry and began a search, the mother helping all she could with a succession of powerful brays. After hunting about for some time without result, we topped a ridge and looked over a hellebore meadow of considerable size, in the center of which was a soft-bottomed swamp of perhaps half an acre in extent.

Sneaking about the borders of the swamp we soon saw the slinking gray figures of two coyotes, while out in the soft part of the swamp, being driven in deeper and deeper, was little Jack, very much frightened, and, with a serio-comic juvenile bray, calling for his mother. At sight of us the coyotes made off, and suddenly little Jack lost all his shyness. If ever a colt burro smiled, little Jack was that one, and he lost no time in loping over to us. On our arrival in camp, Jack, and his mother, and we all, enjoyed a pleasant reunion. But in all probability the coyotes did not feel so happy over this turn of events as the rest of us did.

REPORT OF THE AMERICAN NATURE ASSOCIATION, 1925

Membership During the year 1925 the membership of the American Nature Association reached 100,000. The Association and its work is known throughout the United States, its territories, Canada and Europe.

Within the United States our membership is distributed approximately as follows:

New England, 12% Western States, 13%
Atlantic States, 35% Central States, 35%
Canada, Foreign, etc., 5%

* * *

Nature Magazine NATURE MAGAZINE is the official publication of the Association and is sent monthly to every member. Ninety per cent of the annual dues of each member is designated as subscription to NATURE MAGAZINE. *The magazine belongs solely to its subscribers,* and according to the Charter and By-Laws of the Association, *all profits from its publication must be reinvested in the magazine to improve its quality or expended by the Association for the furtherance of public interest in Nature and the out of doors.*

During the year members have repeatedly commented upon the improvement of material in NATURE MAGAZINE, and particularly upon its beautiful inserts of colored reproductions from Nature paintings. The editors promise a continued improvement during 1926, and the large number of splendid articles and pictures now in preparation gives the fullest assurance that the promise will be carried out.

NATURE MAGAZINE *is the most widely quoted publication in America. Thousands of clippings from newspapers show paragraphs and whole articles quoted from* NATURE MAGAZINE.

* * *

Color Prints of Nature Subjects The growing demand from both private individuals and schools influenced the Association to undertake the preparation of a series of beautiful colored pictures of wild birds and animals. Pictures of this character, correct from the naturalist's standpoint, have previously been exceedingly rare, owing to the cost of high-grade color reproduction.

Eleven paintings, made expressly for the Association by the well-known Nature artist, R. Bruce Horsfall, were reproduced and a copy furnished to each member of the Association beginning with the issue of NATURE MAGAZINE for February, 1925. Extra copies are available for educational purposes at a nominal cost. This work will be continued, thus increasing the interest and educational value of the prints. Each member, in good standing during 1926, will receive twelve new colored prints of the series.

Wild Life Protection and Conservation *The American Nature Association is today the largest organization in the world dedicated to protection of wild life and forest conservation, without catering to the interests of any particular group or class.* It is therefore cooperating with a large number of smaller organizations devoted to similar and specialized aims.

We endorse and cooperate, so far as possible, in the splendid work of the National Association of Audubon Societies for bird protection. Dr. T. Gilbert Pearson, President of the National Association of Audubon Societies is one of the Associate Directors of the American Nature Association.

NATURE MAGAZINE is the official publication of the American Tree Association which is the leading organization in the field for tree-planting and forest conservation. Membership in the American Tree Association, of which Charles Lathrop Pack is also president, is free to every man, woman, or child who plants a tree and enrolls it with the Association.

The American Nature Association cooperates with the Wild Flower Preservation Society of America and other similar organizations in their campaigns for the protection of trees and shrubs, Christmas greens and wild flowers.

* * *

Nature Education The work of the Association in direct cooperation with public and private schools received renewed impetus during 1925. Its leadership in the cause of School Nature Study was definitely established through the affiliation with the Association of Prof. E. Laurence Palmer, of Cornell University, as Director of Nature Education.

Your Association entered this field early in 1924 when it cooperated with the American Nature Study Society in a preliminary survey of Nature Study aims, conditions, methods and progress in the public schools. American Nature Association Bulletin No. 16 published in June, 1925, contained the report of this survey. American Nature Association Bulletin No. 18, December, 1925, contains the report of a further survey conducted under Professor Palmer's direction. These bulletins supply information of the greatest value to teachers of Nature Study and leaders of boys' and girls' camps and similar organizations. The data therein has never before been collected in practicable form.

Following a trip to California in March by the Secretary of the Association and a preliminary report on the school situation, your Association prepared two reels of motion pictures for encouraging Nature Study. Distribution was arranged through the very effective

Visual Education Section of the Extension Department of the University of California. The expense of this project was met by the gift of $1,000 from a member of the Association.

* * *

National and State Parks The American Nature Association stands squarely for the protection, maintenance and necessary expansion of our National and State Park Systems. We also stand for just and efficient park administration.

Your Association is cooperating with the new Nature Guiding services of the National Parks to the end that the wild life and natural beauties of those regions may be made better known to the public. In this connection we published during the past summer Bulletin No. 17, on Nature Guiding in the National Parks, a splendid presentation of the subject prepared by Dr. Harold C. Bryant of the University of California, one of the principal leaders of the movement.

Your Association also prepared last spring two reels of educational motion pictures by William L. Finley. These reels are entitled "Animal Life of the Yosemite" and "Animal Life of the Yellowstone." They were respectively loaned to the Nature Guiding Department of the two parks and have been shown repeatedly during the past season to enthusiastic audiences. Park officials report that these motion pictures have materially contributed to the interest of park visitors in the wild life of both these regions. This work cost about $1,000 which was contributed by an Association member.

* * *

Field Naturalists and Lecturers The officers of the Association are glad to give short educational lectures or talks in response to invitations from groups of members or others interested. In 1925 the Secretary lectured in New Jersey, Pennsylvania, New York, Illinois, Arizona, and California.

The demands from local Nature Clubs, Audubon Societies, Geographic Societies, Women's Clubs and similar groups have so increased that it has become necessary to add to the Association staff another naturalist lecturer, Mr. Guy C. Caldwell, of Colorado. Both Mr. Caldwell and Mr. Finley have given many illustrated lectures under the auspices of the Association and both will be available during the coming winter. (Requests for lectures should be addressed to the Association in Washington.)

* * *

Expeditionary Activities The American Nature Association Expeditionary Fund is the gift of a member of the Association who is particularly interested in providing new fields of activity for the Association and exclusive material for NATURE MAGAZINE.

During the past year a party, led by Mr. Pack and Mr. Finley, spent some time in southern Arizona and California collecting valuable material in the form of articles and photographs. Some of the results of this expedition have appeared in the August and December issues of NATURE MAGAZINE, and further articles of the series will appear during 1926. Very little regarding the wild life of the semi-desert regions has heretofore been published in any popular magazine.

* * *

To Our Members **The American Nature Association is your Association.**

Nature Magazine is your magazine—you own it.

Your continued support alone makes possible the Association's many activities.

The continued growth of the Association is the only means of maintaining and extending its recognized leadership.

Help your Association to grow!

NATURE MAGAZINE AND THE NEW YEAR

ONE THING that makes life and work worth while is that there is always room for progress.

Since its establishment NATURE MAGAZINE has been an attractive publication. This has been proved by the rapid growth in the number of members of the American Nature Association and readers of the magazine. But, as in all else, there is room for improvement.

Beginning with the January, 1926, issue, which is the first number of Volume VII, our readers will find several forward steps. One of these they will find even before they open the magazine. It will give them an idea of the treats in store for them within. It will whet their appetites, so to speak.

Opening the magazine they will find a new treatment of type, adding to the attractiveness of the pages. More than that, this new style means that in the same space there will be about 15 per cent more material.

R. Bruce Horsfall's beautiful color paintings will, of course, be continued. It would detract from the pleasure of discovery to tell what the subjects will be. We will wager, however, that our readers will find the print for the January issue worthy of any wall.

It would be likewise unfair to tell all of the treats in the way of articles to come. They will take our readers to the Arctic with Captain Menander, to the northwest corner of our continent with Edward A. Preble, to the desert of the southwest with William L. and Irene Finley, and to many other interesting places. Albert Payson Terhune will have more of his inimitable dog articles; Ben Hur Lampman will contribute more of his delightful prose-poetry of Nature. To mention a few of the other writers would be to include L. W. Brownell, Harold McCracken, Donald Peattie, Enid Michael, Dr. E. Bade, A. Brooker Klugh, Samuel Scoville, Jr., Arthur Newton Pack, Paul Griswold Howes, Guy C. Caldwell, Otto Wilson, and Tom Gill.

NATURE EDUCATION
Dr. E. LAURENCE PALMER, Cornell University Director
MRS. ANNA BOTSFORD COMSTOCK Associate Editor

When Nature Turns Santa Claus

By Gardiner Bump

IT IS a comparatively simple matter to step into a shop and select a Christmas gift, but it is extremely difficult to secure something which is unusual in a conventional array. And yet within two looks and a peep of most of us, we may find everything necessary to make the most unique in gifts.

Nature is a generous as well as an interesting companion with whom to work. Stroll along an open road of an autumn day and pick a teasel, a goldenrod, a yarrow, and a wheat end, and gild, bronze or silver them into an artistic centerpiece for your table. In passing through a wood break off one of the bracket or "artists" fungi you find on decaying trees, hollow out the middle to receive an old alarm clock, the face of which has been painted white, whittle out of wood a pair of hands large enough to reach the figures scratched on the face of the fungus, attach them and you have a timepiece fit for a library, den, or camp. Convert a turtle shell into a hanging basket for flowers or ferns, or mount a red squirrel holding a thermometer to tell the temperature of chilly mornings.

But we cannot write at length of nature Christmas gifts without mentioning plaster of paris and the innumerable gifts which it is possible to fashion from it. For one who has never "played" with plaster of paris it offers a fascinating opportunity to make at negligible expense such useful articles as book ends, paperweights, stamp boxes, or even an ornate wall placque decorated with original designs of flowers, ferns, leaves, or better yet, animal tracks.

Let your imagination wander to some favorite niche you have long wanted to fill with something out of the ordinary, something unusual to be found out-of-doors. Would not a bronze oval of the track of a deer, of a raccoon's hind foot, or possibly of your own faithful dog fill the bill? Possibly there is a sacred room at home where your books are stowed neatly away on the shelves. There is the place for a couple of bookends holding between them just a few books which you use frequently.

TWO BOOK ENDS

Above the tracks of deer and pheasant; below the raccoon's print.

The gifts you can make are limited in design and adaptability only by your own ingenuity. The list includes napkin rings and candlesticks, salt cellars, fruit bowls, inkstands, ash trays, and cigarette holders. Let your own originality be your guide.

The matter of what tools to buy is a simple one. For instance, in designing the first placque you will need a table knife, a small glass jar or tin pail in which to mix the plaster, two pieces of thin cardboard, and a vessel for water. Fifty cents worth of plaster of paris, a tube of vaseline and a pound of composite modeling wax or plasteline, usually to be found at an art store, complete the list of necessities.

Tracks of various kinds usually furnish the most satisfactory motive for unusual gifts and they are surprisingly easy to secure. Then, thus equipped, sally forth if you will to any near-by brook side, lake shore, river bed, or marsh where animals and birds have written the history of their movements in the soft earth as a reward for the inquisitive, and you should find there a definite outline where the night before a raccoon or a mink was searching for food. Or, perhaps a muskrat has crawled out on the bank, or a heron, alarmed at your approach will take the air with a startled cry. At all events you have found your tracks.

TRACKS SAFELY PRESERVED IN PLASTER

At the left is the print of the snowshoe rabbit, next the otter and fox, with the black duck's track below them and the green heron tracks on the right.

Laying aside your paraphernalia, use a strip of cardboard to make a circle around

the track or group of tracks, if you be so fortunate as to have found such. This keeps the plaster from spreading over too great an area as it is poured into the track.

How to Mix the Plaster

The next step is to mix the plaster. Herein lies the secret of successful track collecting in plaster of paris. Put a small cupful of plaster into a mixing bowl, then add sufficient water so that, when thoroughly mixed by stirring with an ordinary table knife, it will be about the consistency of the proverbial "molasses in January." Be sure, however, that enough water is added to keep the plaster soft and fluid. It is perhaps simplest to use plenty of water at the beginning, reducing the mixture to the desired consistency by adding small quantities of plaster until the result is stable and will barely drop off the point of a knife. At this juncture pour it into the track to the thickness of about three-quarters of an inch, then let it stand until hard. This should take from five to ten minutes at the end of which time remove the cast from the cardboard and wash it in water. You have thus found a new interest in your first animal track.

It is quite surprising to note the rapidity at which your collection of tracks will increase once you have learned to look for them. This is especially so if you find yourself in the country, although the city dweller is by no means excluded. Cats and dogs leave excellent tracks in last night's rain puddle or may often be induced to leave their tracks on the plasteline. A chunk of suet, so fastened that birds in search of a free meal ticket have to walk onto the plasteline, has been known to furnish very satisfactory results.

The First Impression

All impressions in plaster of paris are of two kinds, negative or positive.

TRACKS SERVE ON THE LIBRARY TABLE

On the stamp box are mouse tracks, on the book ends deer tracks, and dog tracks on the ash tray.

Those which are imprinted in the plaster are negative; those which are raised from the main mass of the cast are positive. From one positive or negative any number of tracks may be made in short order. Grease the track well with vaseline, frame it with cardboard and pour in the plaster previously mixed. A fair pressure of the hands should be sufficient to separate the negative from the positive when dry.

With the casting of the first track you will find yourself possessed with the design for a pair of book ends. Flatten out a lump of plasteline on a board base. Make the surface smooth or rough as your fancy dictates; then press the cast of the track firmly but carefully into the plasteline until a satisfactory impression or print results. In order to secure a slant to the face of the cast it is now necessary to raise one end of the board, on which the plasteline is spread, a few inches. Then build thereon a pasteboard box with sides perpendicular into which the plaster may be poured. An old shoe box whose sides have been cut to fit the surface of the modeling wax makes an excellent mold. It is advisable for beginners in the mixing of plaster of paris to stir up two small quantities, one after another, to pour into the mold rather than to run the risk of lumping or hardening the plaster, which danger attends the mixing of any considerable quantity at a time. As you become more familiar with the peculiarities of plaster of paris and of plasteline, short cuts and new ways of doing things will invariably suggest themselves to you, which is all a part of the fun.

Once the book ends have taken definite shape it is but a matter of moments and a few drops of bronzing fluid or paint and they are ready to take their place among the many as unique Christmas gifts.

There is an old army captain friend of mine who hangs over his desk this cryptic motto, "Not How or Why, but Didja?" A number of the above suggestions judiciously distributed among your friends at Christmas time should bring forth from them a general chorus of "Hows" and "Whys"—yes, and of "Didjas," and you will be proud to say, "I did."

Joint Meeting of the American Nature Study Society and the American Nature Association

By Prof. E. L. Palmer

THOSE interested in the cause of Nature Study will have an opportunity during the Christmas holidays of exchanging ideas with individuals of widely varied experience. A joint meeting of the American Nature Study Society and the American Nature Association is to be held in Kansas City, Missouri, Monday and Tuesday, December 28 and 29, with the American Association for the Advancement of Science. The following program speaks for itself:

Monday, A. M.

A. A Look Backward

Prof. M. A. Bigelow, Columbia University.

Prof. Anna B. Comstock, Cornell University.

Prof. O. W. Caldwell, Lincoln School, science in the upper grades.

B. A Look Around

1. Nature Study Teaching in City School Systems with Traditional Organization.

Miss Fannie Stebbins, Supervisor of Nature Study, Springfield, Mass.

Miss Jennie Hall, Supervisor of Nature Study, Minneapolis, Minn.

Miss Clelia Paroni, Supervisor of Nature Study, Berkeley, Calif.

Mrs. Elizabeth K. Peeples, Supervisor of Nature Study, Washington, D. C.

2. Nature Study Teaching in School Systems with Platoon Organization.
   Miss Lenore Conover, Supervisor of Nature Study, Detroit, Mich.
   Mr. John A. Hollinger, Director of Nature Study and Visual Education, Pittsburgh, Pa.
3. Nature Study Teaching in Rural Schools and in Small Cities.
   Miss Alice Jean Patterson, State Normal, Normal, Ill.
   Mr. L. D. Wooster, Prof. of Nature Study, Kansas State Teachers' College, Hays, Kans.
4. Experimental Work in the Content and Method of Nature Study (open to all contributors).

TUESDAY, A. M.

B. A Look Around (*Continued*)

5. The Status of Teacher Training in Nature Study.
   Prof. W. G. Vinal, Syracuse University.
6. Nature Study with the Girl Scouts.
   Dr. Bertha Chapman Cady, Director of Nature Education, Girl Scouts.

C. A Look Ahead

7. Will the development of a general science program in the seventh and eighth grades make Nature Study less necessary?
8. Can Nature Study function effectively if taught only as motivation and correlation for other school subjects?
   The Prospect for Nature Education, Prof. E. L. Palmer, Cornell University.

TUESDAY, P. M.

President's Address.
M. R. Van Cleve, Director of Nature Study and General Science, Toledo, Ohio.
Reports of Committees.
Old and New Business.
Election of Officers.

Nature Study Review

Suggestions for the use in Nature Study of the articles in this issue of NATURE MAGAZINE

By ELIZABETH K. PEEPLES

Teacher in Charge of Nature Study, Washington, D. C., Schools

The German Shepherd-Dog of Ancient Lineage With primary grade youngsters the study of a dog is Nature work of high order, since the material belongs to the home environment, presents endless activity (the phase in which young children are chiefly interested), is large enough to be easily seen, and can be kept without difficulty in the schoolroom for indefinite periods. Should the school Pet Show, or a series of dog lessons include "a police dog," this article on the German Shepherd-Dog will supply a background of information. Ideals of home and family life, and of parental devotion are gained by youngsters through observation of animals and their young. Older children may likewise build a foundation for a later study of eugenics through knowing that animal breeders can by selection control physical characteristics, disposition, and intelligence. That the collie, the pointer, the police dog and other breeds are the result of selective breeding, and that breeders determine in advance what characteristics they desire to develop are facts which should lead in later years to intelligent consideration of how desirable types in human beings are best produced. NATURE MAGAZINE for October, 1925, contains references to other articles on dogs which have appeared in the past year.

Christmas Tree? Why, of Course The thoughtful child, as well as adult, sincerely interested in forest conservation naturally feels a twinge of conscience at the sight of thousands of Christmas trees on sale each year, and even at seeing his individual tree bedecked for the festal day. It is glad news to all such that the use of Christmas trees is a wise use, and therefore a part of the conservation program, provided the tree is obtained by proper means. The growing of Christmas trees as a crop on unused fields should be encouraged, and petty thievery in securing one made to seem as contemptible as it actually is. A talk each Christmas season on this subject is a much-needed Nature lesson.

* * *

Beside the Desert Trail The interests of elementary grade pupils are confined chiefly to phenomena of the immediate environment, but for Junior High School classes the distribution of plants and animals over regions varying in physical characteristics, and the modifications in form and habit developed to meet the exigencies of each situation are matters of import. Pupils of such classes, having formerly grown familiar with the wrens of the home neighborhood, have a basis for comparison between these familiar forms and the rock, canyon and cactus wrens of the Arizona desert. Likewise knowing the flight of the chimney swift, and the nests of the oriole and marsh wren they will read with intelligent realization of the speed of the white-throated swifts of Arizona and of the verdin's architectural triumph. Children of this age, to whose attention has been called the beauty of the sky in its varying moods, will feel a quickening of appreciation for such beauty in reading the author's description of sunset in the canyon; and will begin to catch glimpses of man's true proportion in the mighty plan of Nature from the closing paragraphs. The article is recommended for supplementary reading, and for study of the illustrations.

* * *

Insects of the Snow Before the coming of the first snow let the nature class acquaint themselves with the habits and appearance of the little-known insects called springtails or snow fleas. Having found out the places in which to look, the kind of creature to look for, and the weather most conducive to its appearance, youngsters will sharpen their powers of observation and develop perseverance in the search for springtails. The mystery and seeming contradiction of finding insects living in the snow adds zest to the enterprise. The furcula or leaping

apparatus of a springtail merits special study, and should be investigated under a magnifying glass. To make a "goose-bone jumping jack" after observing the furcula of the snow flea might be suggested as a problem in elementary science which will absorb the attention of many boys and some girls.

* * *

A Sultan in Bronze An outstanding aim of Nature Study from the fifth grade upward is to awaken a sentiment in behalf of conservation. The wild turkey is a seasonable and pointed instance of the need for protection of bird life in America, and since young America is commercially minded, why not introduce the lesson with a comparison of the price of this year's Thanksgiving and Christmas turkeys with the prices secured for wild turkeys in pioneer days when "a first-rate turkey weighing from twenty-five to thirty pounds was considered well sold for a quarter of a dollar?" Our domestic turkey may be observed in a coop in the school yard, or if possible on a nearby farm. The wild turkey may then be studied from museum specimens and pictures, with the enlightening help of the article. An interesting point for consideration is how the domestic turkey proves that habits of wildness linger in the birds and beasts tamed to domesticity. Other instances cited by the author are the horse and dog. Ask the pupils to be on the watch for additional examples. A bit of dangerous advice appears in the last paragraph. It is not always easy to restock territory from which resident birds have been killed with birds from other territory. In fact it is often unwise to introduce foreign stock when native stock is near extinction. This has been found to be only too true with bob whites. Can you guess why?

* * *

Stalking Moose Children old enough to be interested in the special adaptations of familiar animals to their mode of life will appreciate the facts of moose habits and moose structure to which the author calls attention. The moose, which should be observed at the zoo if possible, the museum as second choice, or in pictures, may be introduced as a relative of the deer. His marsh-feeding habit which mires his front feet and thus negotiates the difference between the lengths of his short neck and long legs, and which has long protected him from predatory animals should be discussed. The relation between the build of his neck and the weight of his antlers is food for thought. The author's word picture of "old bulls treading gingerly through the trees with the care of market women bearing baskets of eggs on their heads" makes the shedding of antlers, and the sensitiveness of the velvet-covered soft new antlers unforgettable. The typical moose habitat, their numbers and distribution, and the characteristics of silence, wariness, and speed in motion are well brought out, while the account of hunting the animals with a motion picture camera adds a flavor of adventure. The strips of film reproduced, photographs illustrating the article, and the insert in color afford valuable teaching material.

* * *

Our Christmas Greens—A Real Problem The immediate necessity for checking the slaughter of certain Christmas greens makes this phase of conservation one of the most vital of school projects. An assembly program arranged by children of the upper classes will reach every child in school, and can be made very striking. Let the older children study the Christmas Green Problem as set forth in this article. Ask them to suggest the best way of presenting it to the school as a whole. In the absence of better suggestions, the following plan might be adopted. Several children may make costumes to wear in impersonating the fast-disappearing Christmas greens. Each should carry a small spray of the green he represents, and tell its pitiful story. Other children should follow, each carrying a natural or artificial substitute, tell what it is, how it may be obtained, and at what cost. These children should then decorate the stage (which has been set to represent a room at home) with the substitutes, being sure that an attractive effect is secured. The program may close with a showing of the slides on the subject, which can be obtained from National Wildflower Preservation Society Headquarters. The material selected for each program will vary with the region, but *the propaganda should be presented early,* that is, *before people have bought their Christmas decorations.*

Nature Photography—What Is It?

SHOOTING with a camera is apparently a popular sport, judging by the number of photographs coming in for the Amateur Nature Photographers' Contest. Naturally most of them have to be returned. Some of them are excellent photographs but not strictly Nature photographs. What, then, are Nature photographs, and what kind of photographs will win the distinction of publication?

Let us take the photographs on the next page. Why was the winner chosen? Because not only is it a photograph of wild life, but it combines with it an artistic setting. The picture of the tree growing from the side of a cliff shows Nature sturdily defying obstacles. The picture of Bruin is truly wild life. The "undecided tree" is an interesting photograph of the unusual in Nature. The other photographs are bits of wild life caught by the exploring photographer.

Nature photography might, then, be defined as wild life or the unusual in Nature caught in artistic situation. Many very attractive scenic pictures have been returned. They represented good photography and sense of the artistic, but it is much easier to make a mountain stand still and be photographed than to stalk some wild animal or bird and "shoot" is in its habitat. Some delightful pictures of domestic animals have been returned since this type of photography is comparatively easy.

We would suggest that you turn to the article in this issue entitled "Beside the Desert Trail." In this you will find some remarkable Nature photography, most of it by Mr. and Mrs. Finley. In fact, most of the illustrations in NATURE MAGAZINE each month represent the goal of the amateur Nature photographer.

With the benefit of study of the pictures in the magazine and those on the next page, submit your photographs now for the February contest. They should be mailed to reach this office before the 15th of December, and should be accompanied by a stamped, self-addressed envelope for return. A prize of one year's membership will be awarded the winning photograph and others will be published with full credit given to their authors. Send your photographs to Photograph Editor, NATURE MAGAZINE, 1214 Sixteenth Street, Washington, D. C.

BRUIN A PROWLING
C.S. Farmer. Barrie, Ont.
THE DECEMBER WINNER
COURAGEOUS TREE
Mary E. Osborn. Northampton, Mass.
BABY BLUE HERON
Beecher Berry. Pleasant Hill, O.
MEALTIME
Margaret Hammond. St. Paul, Minn.
MONKEY FACED OWL
Lois Snelling. Hoxie, Kansas.
WISE BARRED OWL
D.E. Flanders. Manchester, N.H.
MERRY CHRISTMAS
Vera Lawrence, Washington, D.C.
NIGHT HERON
Loring W. Turrell. Smithton, N.Y.
AN UNDECIDED TREE
Omer T. Kaylor. Hagerstown, Md.
THE PEANUT HUNT
Annie E. Cobb. Lowell, Mass.

LINCOLN LOGS

For Christmas Gifts
$1 $2 $3
Delivered

"The Building Material of Our Forefathers"

LINCOLN LOGS—Play Things that typify "*The Spirit of America.*" Our Design Book shows how to build "*Lincoln's Log Cabin,*" "*Valley Forge,*" "*The Log Meeting House,*" "*Forest Ranger's Home,*" and many other buildings of Log Construction.

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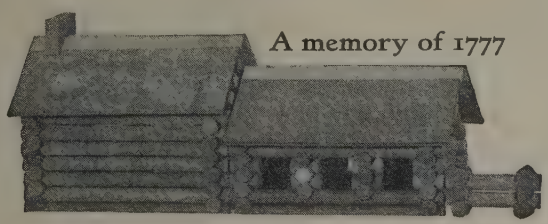
Both boys and girls from 4 to 14 enjoy seeing complete Cabins, Churches, Forts, Doll Houses, Rustic Furniture created by their own hands—they never tire of this unbreakable, lasting Christmas Gift.

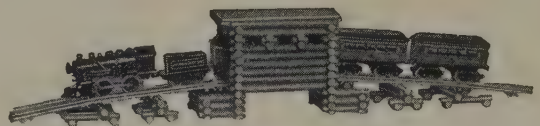


A memory of 1777

And here's "*Valley Forge*"—a visualization of the romance of Colonial Days brought to the child as he builds this and other historic buildings with "*real*" LINCOLN LOGS.

Dedicated to the Great American Builder

Play time with LINCOLN LOGS is an appeal to the child's best instincts—these life-like miniature logs invite the imagination to create new things—they radiate an atmosphere of "*home.*"



The Log Bridge—showing how LINCOLN LOGS "*fit in*" with miniature Transportation Systems and, of course, with other Toys.

TRIPLE SET of 165 logs, 2 roofs, chimney and Design Book, del'v'd. **$3**

DOUBLE SET of 107 logs, roof, chimney and Design Book, del'v'd. **$2**

SINGLE SET, 50 logs, roof, and Design Book, delivered **$1**

The More Logs a Child has— the more things he can build

No need to worry whether someone else "*thinks of the same Gift*"—additional sets simply open up greater possibilities. The child who has one set gets added enjoyment from another one.

SEE YOUR DEALER OR MAIL COUPON AT ONCE TO AVOID DELAY

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Please mail at once, postage prepaid:

☐ Triple Sets of 165 Logs at $3 ☐ Double Sets $2 ☐ Single Sets $1

Enclosed $_____for logs specified above. It is understood that you will refund money if for any reason I should return them after 5 days.

*Name*_____

*Street or R. F. D.*_____

*City*_____ *State*_____

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Thru These 10 power
BINOCULARS

10 Power $26.95

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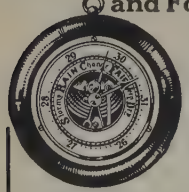
OWN A BAROMETER
and Foretell the Weather



This reliable Barometer enables you to predict accurately any change in weather 8 to 24 hours in advance. Scientifically constructed, attractive in appearance. Highly polished mahogany case, silvered metal dial, heavy bevel glass front. Size 5¼ inches.

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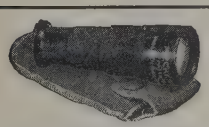
Milwaukee, Wisconsin



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Easily slips in vest pocket, yet powerful, precise, adjustable to either eye, six full magnifications, and brings distant objects close without objectionable "trembling" of higher power glasses. Nothing cheap in appearance or action. Guaranteed satisfactory by us and by maker, or money back at once. Handsome black baked-in enamel finish. Fine flint glass lenses by Wollansak. Check, money order or C.O.D. $2.00 prepaid, including fine limp leather case.

BOSTON SPORTING GOODS CO. 1035 Little Bldg. BOSTON, MASS.

Questions and Answers

QUESTION: *Is the Jewel-weed or touch-me-not poisonous to the touch?—L. R. G.*

ANSWER: The jewel-weed is harmless. The name touch-me-not as well as the scientific name, which is *Impatiens,* refers to the fact that the seed pod, when mature, will burst when touched, scattering the seeds. Its other name, Jewel-weed, refers to the seeds, which are beautiful turquoise-blue beneath their outer coverings.

QUESTION: *I saw a bird the other day about the same size as the red-headed woodpecker. It had a red head and instead of being black and white like the redhead, was mostly gray. It had a tail similar to that of the hairy woodpecker. Could you tell me what it was?—L. S. P.*

ANSWER: The bird you saw must have been either a young red-headed woodpecker in immature plumage or a red-bellied woodpecker. The young redhead has the general pattern of the old bird, but the black is much marked with gray and the white areas are not clear white. The red-bellied woodpecker has a red head, but the red is not quite so brilliant, while the back is grayish and barred crosswise. The underparts are white with a reddish patch on the belly, but this, of course, cannot usually be seen. The habits of both are similar to those of the hairy woodpecker. The red-bellied is usually found in deep and heavy woods.

QUESTION: *Could you supply me with any information regarding the "Mexican Jumping Bean?"—F. P.*

ANSWER: The so-called Mexican jumping bean is the seed of a euphorbiaceous plant, usually a species of *Croton,* growing in Sonora and other Mexican states. The insect which inhabits it is the larva of a moth, *Carpocapsa saltitans,* which lays its eggs either in the blossom or in the undeveloped fruit. The insect develops inside the bean, and as it grows, eats for itself a cavity, until it occupies most of the interior. Its wriggling while in this state, especially when heat is applied, causes the bean to move. It takes several months to pupate, and before emerging as the adult moth, cuts a hole which it lines with a silk-like substance, and soon after crawls out and flies away, usually in February or March. The codling moth, so destructive to apples and pears, and which was imported from Europe, is a related species, being *Carpocapsa pomonella.*

QUESTION: *I have a pet green snake, a grass snake, and wish to keep him through the winter if possible. Can you tell me what to feed him?*—A. B.

ANSWER: It will not be necessary nor desirable to feed your snake during the winter. If you will put him in a deep box with

GERMAN ARMY OFFICERS'
FIELD GLASSES
FREE TRIAL

8 power $9.85 If you wish to keep them

A Practical Christmas Gift

Free trial coupon will bring you these genuine German War Glasses purchased at exceptionally advantageous rates of exchange.

Manufactured by most prominent of German optical factories. Many were received direct from the Allied Reparations Commission. Conservative $20.00 value.

Finest achromatic day and night lenses. 40 m.m. objective. Dust and moisture proof. Pupillary adjustment. Built for service, regardless of cost, according to strictest military standards. All glasses guaranteed in perfect condition. We have sold 80,000 pairs of this model to date.

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Largest importers of field glasses in America
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Gentlemen:

Please send me on 5 days' free trial one pair German Army Officers' war glasses. After 5 days' trial I will either return glasses or remit $9.85.

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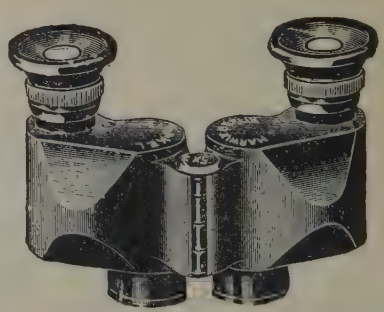
BINOCULARS



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That will be a constant delight to Father, Brother, Sister, Friend, Nature Lover and Sport Enthusiast.

These light weight, wide field, dust and moisture proof Binoculars in an attractive soft suede pouch or hard leather case and strap, will make an enjoyable and welcome gift.

$22.50

After January 1, 1926, price will be $25.00. Solve your Christmas problems with this pleasing and enjoyable gift.

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A GLASS WORTH LOOKING INTO

DROP A LINE TO BASS

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a few inches of earth and some dry leaves, and keep the box in a cool place, he will take care of himself. If out-of-doors he would go deep to be below the frost line, but if kept in a place which is merely cool, less depth is necessary. The box should be covered at the top with fine netting.

NOTE: John W. Titcomb, Consulting Fish Culturist at the State Capital, Hartford, Conn., contributed the following observation on the egg-laying habits of bass and catfish. His comment was inspired by an answer in this department in October which credited the female bass with being guardian of eggs while hatching. Mr. Titcomb writes:

"Fish culturists and aquatic biologists are quite generally in accord as to the fact that in this case 'nobody works but father.' The male not only makes the nest but after the female has deposited her eggs she is dismissed and he cares for them until they hatch, and looks after the brood for a very few days after they come off the nest. I believe this is true of all of the basses and sunfishes, but is notably true of the large and small-mouth bass which have the personal observation of many fish culturists throughout the country.

"They spawn late in the spring or early summer. This is important for the reason that in many states the season opens too early, while the male bass is guarding the nest and can easily be caught.

"With reference to the common catfish or bullhead, it is not at all uncommon to find both the male and female in the nest with the eggs and apparently the male assists the female in guarding the nest. These nests are sometimes quite distinct holes in the mud and sometimes they select old muskrat holes."

NOTE: Again we call attention to the necessity of sending your name and address with inquiries to this department. There is then the assurance that the question will be answered by mail at once.—EDITOR.

A Christmas Gift EXTRAORDINARY!

The World's Highest Quality

Filmo REGISTERED AUTOMATIC MOTION PICTURE CAMERA

for the Individual

THIS is for Nature lovers who wish to avoid the commonplace in Christmas giving. The FILMO Automatic is an unusual gift, it is an unusual camera. W. K. Vanderbilt, J. P. Morgan, Vice-President Dawes, Galli Curci and many other universally known people are typical FILMO owners. Anyone can operate FILMO. Sights like a spy glass, the only method taking motion pictures quickly and accurately. Touch a button and you automatically get theatre-quality motion pictures of what you see. No guesswork. No cranking. No tripod necessary. Half normal speed, double speed, superspeed and telescopic lens features incorporated or available. Free booklet explains all. Pictures are shown on a wall or screen in your own home by means of the FILMO Projector. Designed by the world's largest makers of motion picture cameras and equipment—your guarantee of service and satisfaction. FILMO sold by better dealers. Write at once for descriptive booklet, "What You See, You Get." Address

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Magnified 225 Diameters

This is what the tip of a fly's leg is like when seen thru the

Ultralens Microscope

At last the high powered microscope is within the reach of all who wish to study, observe and experiment with the vast world of minute objects that are invisible to the naked eye. A remarkable discovery enables us to manufacture the Ultralens Microscope (magnifies 225 diameters) for **one-eighth the usual cost.**

$7.50 for Complete Outfit, prepaid

EASY TO USE

Any amateur can immediately start using his Ultralens to examine the edge of a razor, the mesh of a cotton shirt, the bacteria in dirty water. No technical training required, yet hundreds of scientists and teachers are using this instrument today. It is at once interesting, instructive and scientific. Gives enormous magnification and perfect definition.

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The Ultralens Microscope comes packed in a beautiful Leatherette case with full instructions that any one who can read can understand. Lenses of 125 x and 325 x objectives can be furnished at $1.50 each.

ORDER TODAY

Order direct from this advertisement and get your Ultralens Microscope now. Fully guaranteed. If, however, you desire more information before purchasing we will gladly send free descriptive catalog.

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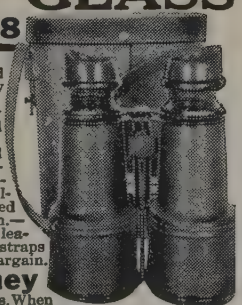
Dept. 205 MILTON, PA.

FIELD GLASS

Genuine Chevalier only $6.98



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Send only name and address. When field glasses are delivered deposit with Postman our special low price of only $6.98 plus postage. (Regular $15.00 value) case and straps included free. Satisfaction guaranteed or money refunded. Send at once. Bargain Catalog FREE.
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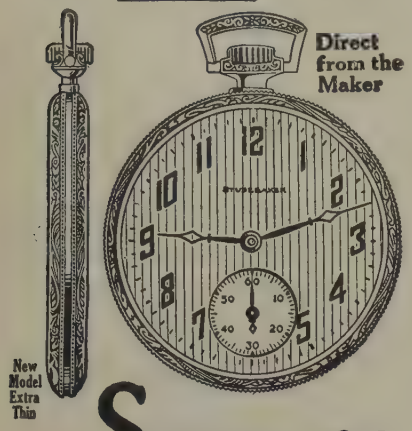

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American Nature Association
1214 16th St., Washington, D. C.

30,000 *Antelope Survive*

Difficult as such an undertaking may seem, a careful census has been taken of the prong-horned antelope, the only species of antelope native to America. It has survived in scattered small herds over a very large proportion of its original range in sixteen of the western states of this country and in Canada and Mexico. In 1922 it became evident that the time had arrived for taking active measures leading to the conservation of the dwindling numbers of the antelope if its extermination were to be averted. A census was conducted during the following two years by field men of the Biological Survey of the United States Department of Agriculture, with the cooperation of conservation societies, state agencies, and individuals not only in this country but also in Canada and Mexico.

According to the results reported by Dr. Edward W. Nelson, chief of the Bureau of Biological Survey, there are now approximately 30,000 pronghorn existing in North America in a total of 286 scattered bands. In view of the great territory occupied by the pronghorn, it may be considered a conservative estimate to place its probable original numbers at not less than thirty to forty millions, and probably more.

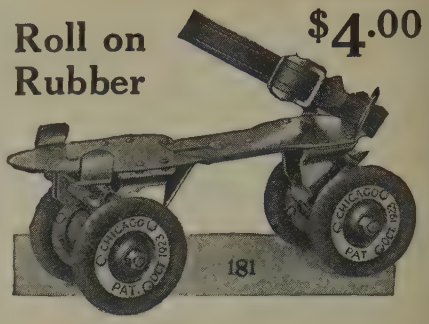
Still Climbing

Travel in our national parks continues to mount in volume according to figures of the Yellowstone Park issued by the National Park Service. The total travel in this playground for 1925 was 154,282, as compared with 144,158 during the season of 1924. Of this year's total 44,766 came by rail; 106,329 by automobile; 180 aboard a motorcycle; 1,245 on horseback or afoot and 1,733 before the season opened.

Moose in New York

Game Protector D. W. Seckington, of Elizabethtown, N. Y., reports that a very large bull moose was seen by several people at Wadhams and on the outskirts of Elizabethtown village recently. There is no open season for moose and they are rarely seen now in New York State although they once ranged in numbers in this vicinity.

Roll on Rubber **$4.00**



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Boys and Girls, tell Dad your opportunity to get the world's finest skates at lowest price ever offered.

OBSERVE—Write name and address plainly, give age and whether for boy or girl. Include P. O. Money Order. We back our skates to the limit. Order today—avoid the rush.

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Give to satisfy a Hobby and you'll give maximum enjoyment. Our catalog is an exposition of hobby-satisfying gifts for everyone on your shopping list. Write today for a copy of this catalog. Let us simplify your Xmas shopping.

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BLOW GUNS SUCH AS Indians Used

Now you can enjoy this old art, just rediscovered in the Zulu Blow Gun.

Boys and Girls Love It!

The Zulu Blow Gun is noiseless, harmless and keeps children amused indoors or outdoors for hours and at every blow develops their lungs.

The ideal Christmas gift. Order yours now! Send name, address and $2.25.

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200 Sheets 100 Envelopes $1.00 POST PAID

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on every sheet and envelope in rich dark blue, up to 4 lines. Type is Plate Gothic, designed especially for clearness and good taste.

Makes a personal stationery you will be delighted to use. An ideal gift with your friend's name. Attractive 3 letter monogram if preferred.

Just send $1.00 (west of Denver and outside U.S., $1.10) and this generous supply of stationery will come by return mail, postage prepaid. Securely packed in a sturdy blue box. Please write or print clearly. Prompt service and satisfaction guaranteed or money refunded.

National Stationery Co., 1459 Lincoln Highway, Batavia, Illinois

What of the Past?

Enlistment of the people of the United States in supplying information on prehistoric North America is being inaugurated by Dr. E. E. Free, Science Editor of *The Forum*, 247 Park Avenue, New York City. He holds that surprising and valuable information can be gathered from Indian rock paintings known to exist in many parts of the country. Some of these have already yielded valuable scientific clues as to the flora and fauna that once existed and is now no more. The cooperation that Dr. Free desires is to have called to his attention the existence of such paintings in order that they may be photographed and recorded and investigated.

In a Good Cause

This is not an advertisement and then, again, it is. Many of our wild flowers are going rapidly, and we have another spring ahead of us with no decrease in the number of automobiles and prospective picknickers. The only way to save many of these flowers from extinction is to leave them where they grow for others to enjoy. The way to know how to discriminate is to know what the flowers look like. A very attractive set of colored postal cards have been prepared in this cause. They are available from the Wild Flower Preservation Society in Washington, D. C., at two for five cents or twenty-five cents a dozen, plus two cents for mailing, or in large lots from Catherine A. Mitchell, Riverside, Ill., at $40 for 2,400 cards. Each carries a brief instruction about the flower with its popular and Latin name. They include Cardinal Flower, Trailing Arbutus, White Trillium, Flowering Dogwood, Maidenhair Fern, Wild Columbine, Mountain Laurel, Showy Lady's Slipper, Dutchman's Breeches, Fringed Gentian, and Bloodroot.

All Bees in This Course

Practical experience in beekeeping is a part of the curriculum in a number of rural schools in the Province of Ontario. In 16 schools in Wentworth County bees are kept in observation hives in the schoolroom. The study involves little extra work on the part of the teacher, and is valuable as a Nature contact and in contributing to the promotion of a great productive industry. The sale of honey in many of the schools has been more than sufficient to cover in one season the expense of installation and upkeep.

What Greater Gift

—than the Joy of Perfect Skating!

When you feel the brisk kiss of winter winds on glowing cheeks—
when you tingle in every sinew with buoyant exercise—
when you glide with a rythm like glorious music, and your feet skim the ice, firm and sure, with the speed and lightness of the wind—
then you know why the "king of winter sports" is to skate on Nestor Johnsons!
You can see for yourself the quality built in every detail of that braced and tempered steel runner. You see the bell-shaped, one-piece cups at the heel and sole, and the reinforced foot-supporting shoe attached to Nestor Johnsons.

But better than this—you can take the judgment of champions, for more championships have been won on Nestor Johnson's than on all other skates combined.

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NestorJohnson "North Star" for those that want the best

NESTOR JOHNSON TUBULAR SKATES

NestorJohnson "Flyers" at a price all can pay

NORTHLAND SKIS

for Christmas

No present for a sport-loving person in the snow belt will be more appreciated than a pair of Northland Skis known the world over for dependability, sturdiness and ease of handling. Look for the deer-head trademark.

Free booklet on "How to Ski"

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200 SHEETS 100 ENVELOPES
Size of sheet 5⅝ x 7⅛; envelopes to match. Heavy white *Watermarked* bond. Perfect writing surface.
Also ARISTOCRATIC Linen Finish Stationery, 200 sheets, 100 envelopes, $1.50
Name and address PRINTED FREE on every sheet and envelope in rich, dark blue. We prepay postage and GUARANTEE SATISFACTION.
Send name, address and money order (10% extra if west of Denver) to
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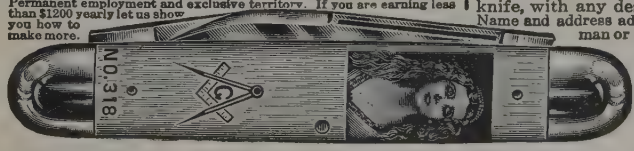

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Keeps the food dry; feeds automatically; avoids waste; lasts years; weighs a pound and a half.

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A balanced ration; best for the birds; best for use in the food-house

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With Thoughts of Spring

For Old or Young

In City, Town or Country

No. 1 No. 2

Cozy Cots for Feathered Friends

Above forms, Nos. 1 and 2, complete and ready to hang. Each $1.25, postpaid.

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Sanctuary at Yale

Providing a valuable adjunct to the work of various departments, and assuring the preservation of local flora and fauna, the announcement that two hundred acres of the Ray Tompkins' memorial tract has been set aside as a preserve by Yale University is significant. Henry S. Graves, Dean of the University, says that "abounding in shrubs, trees and flowers, already a refuge for birds and animals of interest to the zoologist and within easy reach of the university, the preserve offers an unusual opportunity for research and for class work in the field." Facilities for Nature study are becoming an essential part of the equipment of any well-equipped educational institution.

A Clever Beggar

Writing in the Nature Notes of the Yosemite National Park Nature Guide Service, R. D. Haywood tells an interesting squirrel story:

"Those who have lunched at Glacier Point have been attracted by the grand old patriarch of the ground squirrels. He is fat and grizzled, apparently by many battles, which ought to indicate age and prowess. He has learned to trust man, for he will feed from the hand on the dining porch of the hotel. Recently he exhibited an extreme of trust or of greed triumphing over fear. A man coaxed him onto his lap to take food from his hand. The squirrel sat there while he ate all the marmalade off the bun proffered him. Then, apparently having had enough, he ran with a large piece remaining to the protection of a nearby chinquapin bush. Here, after two futile attempts, he finally got it carefully placed in the ground. The hole was considerably deeper than the food deposited therein and after burying it he carefully stamped down the ground over it. Then he dug one more false cache before scurrying back for more food. What a civilized beggar!"

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The National Forests of Oregon and Washington during 1924 yielded 704,386,000 board feet of timber for cutting at a value of $1,449,898.48, according to figures given out by C. M. Grenger, District Forester.

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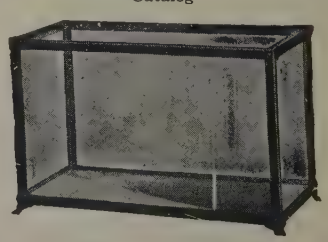

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To Save Ruffed Grouse

Sportsmen of New England are organizing to assist financially and otherwise in the work of studying the disease that is besetting the Ruffed Grouse and threatening tremendous depletion if not extermination. A fund of $10,000 is being raised for this work, to which sportsmen are being urged to contribute by the Massachusetts Fish and Game Protective Association. One of the first donations came from the Federation of Bird Clubs of New England. Further cooperation is being urged in the form of sending to Dr. Alfred O. Gross, Brunswick, Maine, who is carrying on the study, small, thin, or even healthy birds, or intestines of these birds liberally sprinkled with salt and accompanied by a note of the location where they were obtained and date.

Snow-flecked Robin

A member in Pittsfield, Mass., who signs himself or herself as "An Appreciative Subscriber," writes: "A family of five robins appeared on the lawn this September afternoon. Among the three youngsters, who could hardly be distinguished from their parents, was one whose red breast and brown back were irregularly spotted with white. One could easily imagine that the bird had just emerged from a snowdrift." This is the normal plumage of the young robin. The writer adds some other experiences with oddities in Nature including the finding of two bluets, one with five and one with six petals; a double ox-eyed daisy; a double dandelion; a patch containing many clovers having more than three leaves; and two red clovers that were pure white.

Grape Embargo Holds

That the danger of introducing the Mediterranean fruit fly still exists, is the conclusion reached after a reinvestigation of the conditions in the Almeria grape district of Spain by C. L. Marlatt, chairman of the Federal Horticultural Board. The study was made at the request of the United States Department of State.

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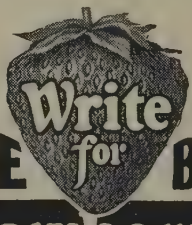

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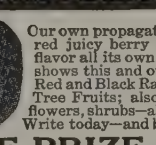

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The Spotted Sandpiper

David D. Keck in the Yosemite Nature Notes of the Yosemite National Park contributes the following interesting observation:

"If one is fortunate enough to find a family of young Spotted Sandpipers running about under the direction of the parent he should spend a few minutes observing the birds' behavior. The agitated calls of the mother are sufficient to cause the young birds to 'freeze' in their tracks. A brood of young observed on the island next to camp 6 disappeared practically under the observer's gaze. The mother bird was very excited, while her young ones were crouched low among the pebbles in the open and would run about pretending to be feeding, but frequently climbing a little plateau about a foot and a half high, from whence the young could be watched. As no danger approached, one of the young birds dashed for the bank, and upon my approach huddled close to the bank, as though trying to protect itself from being stepped upon. The minute I looked in another direction they were off for the tall grass, where the mother felt reassured and became quiet. The protective coloration of the young birds when 'freezing' in a group of stones makes it very hard to detect and it will not under any fright run again until the coast is clear."

Regard the Fireworm

"The most interesting phenomenon which we have observed for the last 10 evenings is the appearance on the surface of the water of the annelid *Odontosyllis,* or fireworm," writes Dr. P. S. Galtsoff of the Bureau of Fisheries in the Fisheries Service Bulletin, in connection with his research work in Bermuda looking toward increasing oyster production. "The animals appear with the surprising regularity and accuracy of a good chronometer. Exactly fifty-seven minutes after sunset one may see the bright, moving spots on the surface of the sea. They are about one inch long, and the females and males are distinguishable. They swim in circles, first turning twice to the right and then twice to the left. The females excrete a substance that remains phosphorescent for one or two minutes. The males are brightly phosphorescent, but do not excrete any luminescent matter; they are positively phototropic and easily attracted by the flashlight. After fertilization the phosphorescence of both sexes stops instantly. The 'dancing' lasts for only twenty minutes and always occurs the first day after the full

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CAN YOU PRONOUNCE—comparable, epitome, acclimated, table d'hote, masseur, fiance, cuisine, bon voyage, vers libre, Ypres, Sinn Fein, Bolsheviki, Il Trovatore, Paderewski, Les Miserables, Nazimova, Galli-Curci?

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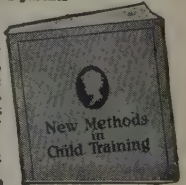

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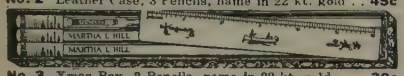

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moon and continues for ten days or a fortnight. It is interesting to note that the appearance of the fireworms has no relation to the tide stage; they occur at flood tide as well as at the ebb, but always fifty-seven minutes after sunset. The phenomenon certainly has no relation to fisheries problems, but is of the greatest interest to every biologist."

New Yosemite Wonders

Many have been the summer tourists who have found added enjoyment in Yosemite National Park from the Glacier Point lookout opened on June 10 by C. P. Russell, Park Naturalist, in the presence of members of the Congressional Appropriations Committee. The splendid high-powered binocular telescope met with great enthusiasm on the part of the visitors when they discovered how quickly they might be transported to the ice fields of Mt. Lyell, eighteen miles away. Climbers on the summit of Half Dome, invisible to the naked eye, were readily recognized through the powerful lenses. Geological features, previously talked about but unseen from Glacier Point, were centered upon and brought to the very feet of the group. Western junipers, miles away, were so magnificent as to make identification possible.

This branch of the Yosemite museum, with its accompanying extension of the nature guide service is the first accomplishment of the Yosemite Natural History Association. The construction of the picturesque stone lookout, superintended by Architect Herbert Maier, was undertaken by the association with the cooperation of the Yosemite Park and Curry Company, the National Park Service and the American Association of Museums. A naturalist is now stationed at Glacier Point who will entertain the thousands that climb from the valley, thirty-two hundred feet below.

Fire and Forest

An interesting and significant story is told by S. B. Show and E. I. Kotok of the United States Forest Service in a bulletin, "Fire and the Forest." This publication is based upon extended studies that show the effect of fire more far reaching than merely the first burning over of a forest fire. It emphasizes that repeated burnings cut the potential value of the lands for timber production far below the point where profitable lumbering can be carried on.

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Mr. Arthur P. Wyand lives within a mile of the National Capital. In his yard are three ailanthus trees which recently played host to the ailanthus moth, introduced into this country some years ago in an attempt to build up a silk business. These moths, known as *Philosamia cynthia,* were in plenty on his trees, feeding mightily of the leaves. Soon there came a number of yellow-billed cuckoos, who set about feeding mightily upon the moths. Mr. Wyand has been actively engaged in getting acquainted with the moths, at the same time happily playing host to the birds.

Says Peter Showcase

William L. Finley, our western field naturalist, has received the following reaction to his article on baby wild cats from the typewriter of "Peter Showcase and 47 Others":

"We, the undersigned, the people of California, would hereby respectfully enclose our thanx for the thrills we have received from reading your scratchy story in NATURE MAGAZINE, but would also loudly protest against your boosting wildcats as pets, for they are stingers, just like our So. Cal. wildcat oil 'wells' in which much our capital has been permanently planted. No doubt you remember Dave Thompson's boy, who was probably your schoolmate, and how he tamed a deer so that it would nose into his pockets for cigarettes, and how he struck across the pasture one day and his pet deer either killed or near-killed him, and we all hope that some day your Audubon Society will reform the appetites of bluejays and their close cousins so that they will finish up a Bartlett pear on a tree b4 starting in on another one, instead of spoling a dozen on each tree by boring holes into them. Up in Lake County an old lady tried to protect her pear orchard from these swearing swashbucklers by paying boys ten cents for everyone they shot in her orchard, but a big percentage of her crop was spoiled just the same."

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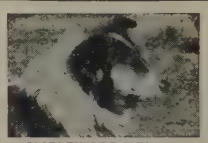

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Diversification is a long word applied to mixing up the farmer's crops so that there will not be an excess to be marketed at a loss. The farmer that has recognized the soundness of this economic policy will find an idea in Farmers' Bulletin 1453, recently issued by the United States Department of Agriculture. This pamphlet is entitled "Growing and Planting Coniferous Trees on the Farm." It is a direction book for setting those idle and poorer acres to work growing a profitable and increasingly valuable crop. On woodlots we must depend for no small part of our future timber crop and the farmer with foresight will find this publication valuable.

Birds and Spiders

"Several people spoke doubtfully to me as to the truth of such an observation," writes Dr. S. W. Frost, of Arendtsville, Pa., commenting on the little article in the October issue of NATURE MAGAZINE about the bird being caught in a spider's web. "It may therefore interest some readers to know that there are other instances of birds becoming ensnared in spiders' webs. Mr. S. W. Bromley records, in the Bulletin of the Brooklyn Entomological Society for 1924, a field sparrow that was caught in a spider's web and describes it in detail. He also notes further records by good authorities of similar observations. Records like the one in NATURE MAGAZINE are highly valuable, as they help to strengthen the truth of such interesting observations."

Is There An Increase?

With the help of unpaid volunteer observers, the Biological Survey of the United States Department of Agriculture is taking a bird census in selected areas throughout the United States. The purpose of the bird census is to furnish information on the effectiveness and thoroughness of bird protection and to throw light on many problems concerning the distribution of bird life. The facts, when completely compiled, should be of great interest to all bird lovers.

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(*Gen.* indicates a general article; *illus.*, a photograph or drawing; *rev.*, a review)

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THE TREE PLANTING ARMY

Thousands of trees planted during Scout Week and during American Education Week. All should register

From the way the registrations are coming in the Girl Scouts have broken all records for tree planting as a unit. On October 31, Founder's Day, the troops throughout the country planted memorial trees for Juliette Low, the founder of the organization in 1912. In Washington the Arbor Patrol of the fifty troops in the District of Columbia planted a tree in front of the Little House, as the headquarters is known. The Arbor Patrols then went inside and gave the ceremony of blessing the Little House, thus dedicating it to Girl Scouts' use. The program was in charge of Mrs. Henry Flather, the scout commissioner of the District, Evelina Gleaves, Betty Adams and Catherine Vaux.

At Camp Andree, Above New York City, tree planting was carried out at the direction of Mrs. Jane Deeter Rippin, the national director. Near the camp there runs the Low Highway, named in honor of the founder, and this is being planted with memorial trees. The editorial staff of *The American Girl* did a great educational work in cooperation with the American Tree Association in placing tree-planting information and tree-day programs before the troops.

Every troop should at once register its tree planting on the honor roll of the American Tree Association. Among the first to join the tree-planting army were: Juliette Low Camp at Cloudland, Ga. Troop 4, Homestead, Pa.; Troop 14, Kingston, Pa.; Wyoming Valley Council, Wilkes-Barre, Pa.; Troop 3, Pittsburgh; Philadelphia Council. Manhattan Council, New York City; Camp Calemaco, Central Valley; Troop 8, Middletown; Westchester Council, White Plains; Troops 1, Johnstown; Elmira Girl Scouts; Montour Falls Troop; Troop 2, Newburgh; Yonkers Troop; Pine Cone Troop, Waterville; Palmyra Troop. Cloverleaf Troop, Emerson, N. J.; Jersey City Girl Scouts; Troop 36, Newark; Plainfield Troop. Rahway Council, High Bridge Troop; Holly Troop 11, West New York; Troop 2, Westwood, N. J.; Weehawken Troop. Escondido Troop, Calif.; Santa Barbara Council, Region 11 and 12, Palo Alto; Troop 1, Los Altos; Troop 12, Hartford, Conn.; Guilford Troop; Stonington Troop; Long Lane Troop, Middletown; Litchfield Troop. Troop 5, Hamilton, Ohio; Troop 2, Cleveland; Valley View Troops, Cincinnati; Barberton Troop. Troop 44, St. Louis, Mo.; Joplin Troop; Bowling Green Troop, Forsythe troop. St. Paul, Minn., troops; Little Falls troop; Troop 1, Cushing; School for the Blind troop, Faribault. Middlesboro, Ky., troop, Paducah troops. Knoxville, Tenn., Council; Troop 10, Buntyn; North Chattanooga troop. Garret, Ind., troop; Betsy Ross Troop 2, Peru, Ind.; Rensselaer troop, Vincennes troop, Winemac troop. Kayford (W. Va.) troop, Fairmont troop, Itmann troop. Troop 1, Flint, Mich.; Lake Linden troop; Troop 2, Ishpeming; Pontiac troop. Beaver Patrol, Fitzwilliam, N. H., Salem Depot troop, Portsmouth troop. Troop 1, South Jacksonville, Fla.; Troop 1, Taft, Fla.; Troop 2, Pensacola; Kissimmee troop. Montevallo troop, Ala., Gadsden troop. Troop 1, Mokena, Ill., Elmhurst troop, Mt. Carmel troop; Lake Pleasant Camp, Elkhorn, Wis.; Janesville troop. Charleston, S. C., troops. Troop 1, Sulphur Springs, Tex. Des Moines, Iowa, troops. Troop 1, Chelmsford, Mass. Norwood troop, Troop 1, Arma, Kans. Longmont, Colo., troop. Lucas, S. D., troop.

This tree-planting program was followed by general planting throughout the first week in November. The Boy Scouts and the Camp Fire Girls were other organizations putting on big tree planting campaigns on in all parts of the country. Many trees were planted on the birthday of Theodore Roosevelt, and during American Education Week thousands of trees were planted on tree day and conservation day of that week.

One of the most remarkable tree plantings reported to the American Tree Association was the planting of tree in memory of James Whitcomb Riley by the schools of Hancock County, Ind. Greenfield was the rallying point and the Riley Memorial park was dedicated.

At Sibley, Iowa, the Bayberry Chapter of the D. A. R. has planted a memorial tree and registered it with the American Tree Association.

The tulip, the official tree of Indiana, was planted at the ceremony marking the one hundredth anniversary of the founding of the city of Lafayette. Boy Scouts conducted the tree planting.

A community Christmas tree has been planted by the Semper Fidelis Club of Savannah, Mo.

At New Rochelle, N. Y., a Christmas tree has been placed in the grounds of the First Presbyterian Church by the Tree Committee of the Garden Club.

An oak in memory of Susan B. Anthony has been presented to the Federation of Women's Clubs of Rochester, N. Y., by the Rochester Chapter of the Sons of the American Revolution. Mrs. F. S. See accepted the tree for the women's clubs.

In the Pittsburgh Public Schools Arbor Day programs were carried out, one of the first to register being the Friendship School where Annie L. Lafferty directed the work.

At Kent, Ohio, the State Normal College plans to set aside an acre of the campus for planting to nut trees. May H. Prentice has charge of the plans.

In Cleveland the tree planters started early with their plans. The Silver Fox Tribe of the Lone Scouts was one of the first organizations to get tree-planting instructions. Hundreds of applications were received from schools.

At the direction of O. O. McMillin, of the Bronough, Mo., schools, sixty pupils have registered their trees on the Association's honor rolls.

The only way to join the American Tree Association is to plant a tree and register it with the Association, 1214 Sixteenth Street N.W., Washington, D. C. The Association will send tree-planting suggestions and a tree-day program for two cents to pay postage.

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